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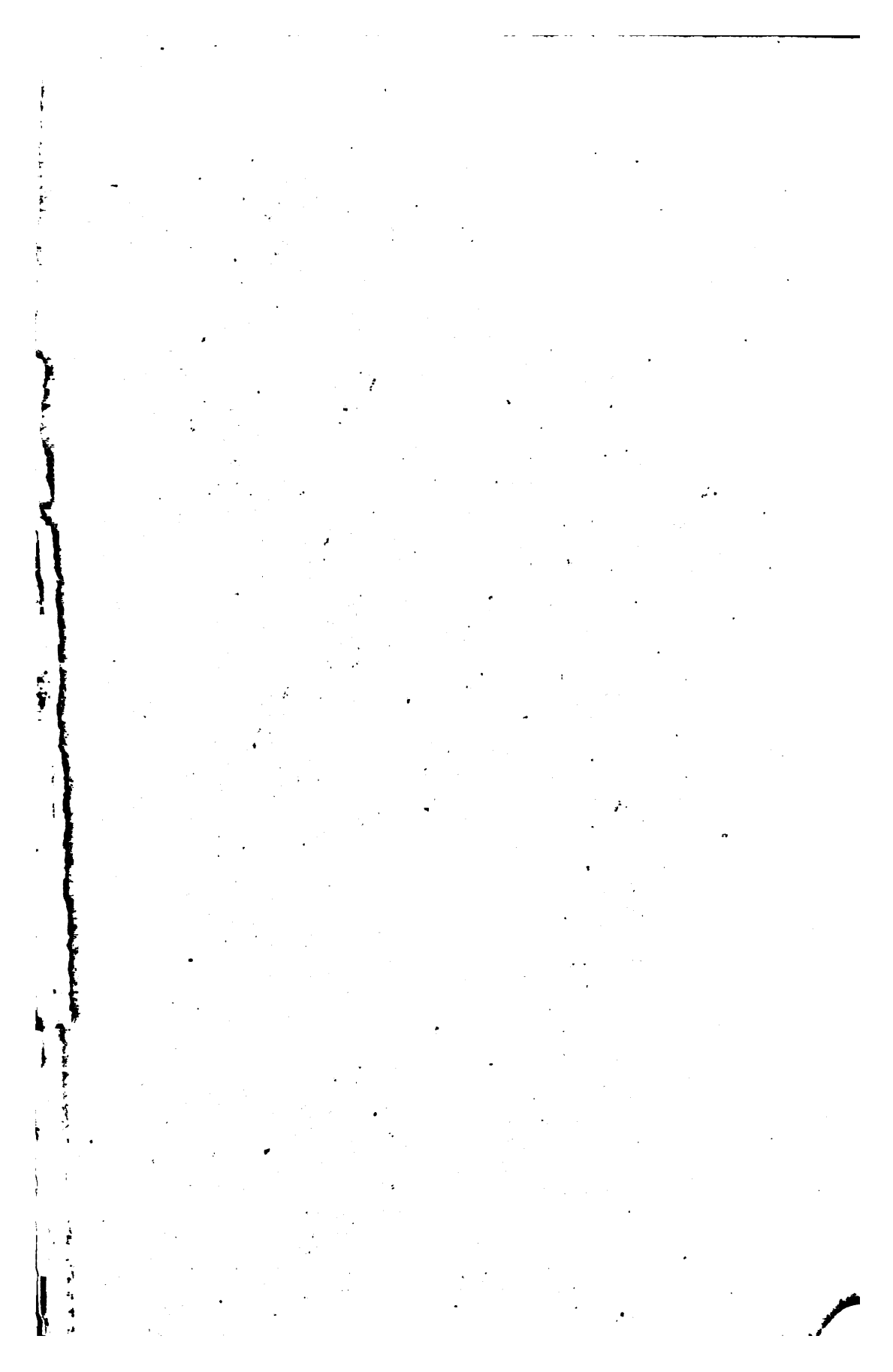
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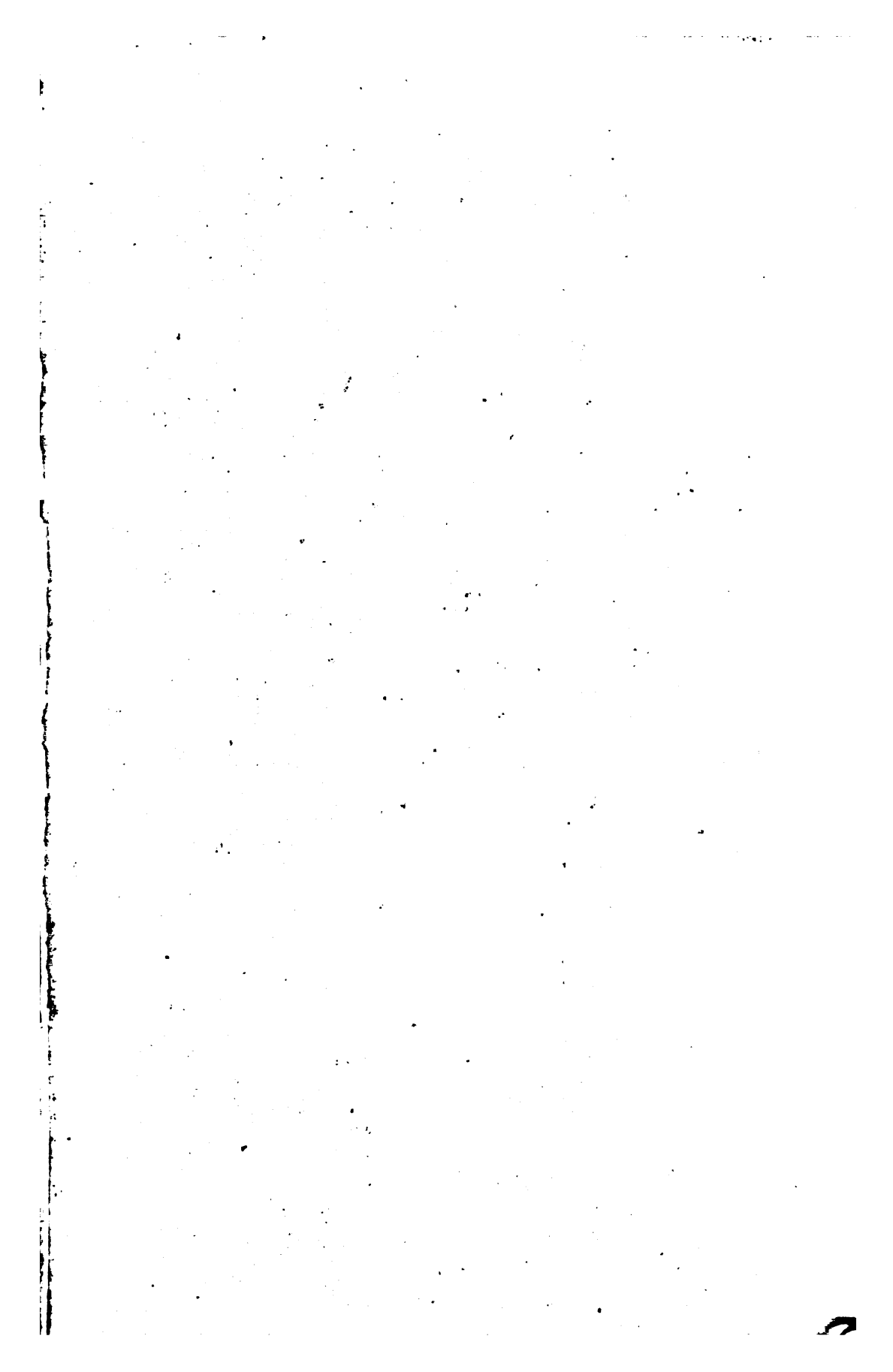
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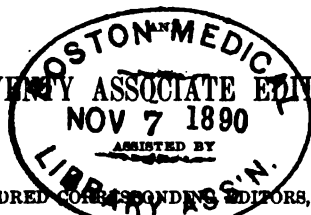
ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY

CHARLES E. SAJOUS, M.D.,

SEVENTY ASSOCIATE EDITORS,
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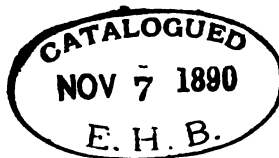


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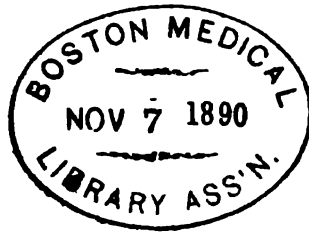
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DISEASES OF THE BRAIN.

By LANDON CARTER GRAY, M.D.,
NEW YORK.

CEREBRAL LOCALIZATION.

ALTHOUGH the literature of the year on the subject of disorders of the brain might be considered as profuse, the great majority of the papers published do not come within the scope of the ANNUAL, belonging rather to the category of able reviews. I have, therefore, limited my attention to the works that seemed to contain progressive features.

Practical Relations of Cerebral Localization.—Ferrier,⁴⁷ considering the question of cerebral localization in its practical relations, discusses the subject under three heads. The article is so valuable that we quote freely from it:—

“I. Is our knowledge of the functions of the human brain and of the localization of cerebral disease sufficiently advanced to enable us to determine, with a fair measure of accuracy, the localization and nature of disease affecting the cerebral hemispheres?

“Apart from a few empirical generalizations and brilliant hypotheses, the doctrine of cerebral localization first entered on the stage of demonstration and prediction with the experimental researches begun by Fritsch and Hitzig in 1870. It is since this time that the facts of clinical medicine have been capable of being read intelligently, and that order has been gradually evolved out of what was previously almost chaos and confusion. There is still, however, considerable diversity of opinion as to the explanation of many clinical facts, and the application of the doctrine of cerebral localization to the diagnosis of the nature and seat of disease has not always been verified in practice; but it is generally admitted that, even when errors have been committed, it is not the principle itself but its application that has been at fault.

“The region lesions of which are perhaps the most common and most easily determined is the Rolandic zone or motor area—

so called because disease situated here invariably leads to motor disorders, spasmodic or paralytic. One of the most significant indications of cortical disease in this region is the occurrence of unilateral spasms—appropriately termed Jacksonian epilepsy—limited to the leg, arm, or face; or, if not altogether limited, commencing always, or nearly always, in the same part, and invading other muscular groups in a certain definite order. If the spasms begin in the face they next attack the arm, and then the leg; if they begin in the leg they attack the arm next and the face last. These attacks are not necessarily accompanied by loss of consciousness, though this not unfrequently happens when the spasms have become general and pass also to the opposite side. A mere irritative lesion does not necessarily imply demonstrable organic disease, and the starting-point of the irritation may be elsewhere than in the part discharged. But if, following these limited spasms, paralysis of motion should occur in the parts formerly convulsed, i.e., if the monospasm give place to a monoplegia, and, still more so, if a succession of monoplegiæ should result in a general hemiplegia, then we may with certainty diagnose organic disease of the Rolandic zone of the opposite cerebral hemisphere. If the leg is specially affected the lesion is in the upper third of the Rolandic convolutions; if the arm, in the middle third of the Rolandic convolutions; if the face, in the lower third of the Rolandic zone. And we may more precisely localize the lesion in the upper or lower half of these divisions respectively according as the proximate or distal movements are more particularly affected. Lesions of the lower facial region, in the left hemisphere, are almost invariably associated with motor (Broca) aphasia.

“According to the extent of the destructive lesion, the paralysis is temporary or permanent—in the latter case followed by descending degeneration in the pyramidal tracts. The electrical reactions of the paralyzed parts are not appreciably modified. In the great majority of the recorded cases of cortical paralysis, sensation has been found unimpaired; but, on the other hand, a considerable number of cases have been put on record in which, with lesions of various kinds (including tumors) implicating the motor zone, there has been paralysis not only of motion, but also of sensation in a greater or less degree. Very divergent views have been expressed in reference to the interpretation of these facts. I have

maintained—and a similar opinion has been expressed by Charcot, Nothnagel, etc.—that there is no necessary connection between cortical lesions of the motor zone and affections of sensibility ; and I am, further, of opinion that the motor and sensory centres are anatomically distinct from each other, though functionally and probably organically connected together. Others (Exner, Luciani, etc.) hold that the sensory and motor centres coincide, and believe that cortical motor lesions affect common sensibility as well as motion. Bastian believes that with lesions of the motor zone there is paralysis of the muscular sense ; while Nothnagel is of opinion that paralysis of the muscular sense is related not to lesions of the cortical motor zone proper, but to those implicating the inferior parietal lobule. It is evident, from the discrepancy of views thus enumerated, that the facts of disease on which they are based are neither uniform nor altogether simple.

“ Mere frequency, as the records of cerebral disease amply illustrate, is not sufficient to establish direct causal relationship between the obvious lesion and the symptoms exhibited. Whereas paralysis of motion is invariably caused by truly destructive lesions of the motor zone, anæsthesia is only of occasional occurrence in connection with apparently similar lesions. There is no relation between the extent, degree, or duration of the motor paralysis and the impairment of sensation, for there may be the most absolute paralysis of motion with perfect sensibility in all its forms, cutaneous as well as muscular ; and the motor paralysis remains when anæsthesia, if any, has entirely vanished. And, on the other hand, in connection with certain cerebral lesions, there may be absolute anæsthesia with practically unimpaired motor capacity. If there were on record one-tenth of the number of cases of destructive lesion of the so-called motor zone without motor paralysis as there are of similar lesions without loss of sensation, the whole theory of a special motor zone would have to be abandoned. From this I think it may be concluded that the sensory and motor centres do not coincide, and that the anæsthesia sometimes observed in connection with lesions implicating also the motor zone is, in reality, due to direct or indirect implication of sensory tracts or centres. A sensory zone proper is not a mere matter of speculation, but a *vera causa* ; for it has been demonstrated beyond all question,—in monkeys, at least,—by my own and the experiments of Horsley and

Schäfer, that the falciform lobe is the cortical centre of common sensibility, inasmuch as destructive lesions of this region produce hemianæsthesia on the opposite side of the body. The position of the sensory tract in the posterior division of the internal capsule is also well known, but we are still in need of information with respect to the position and course of the tracts which connect this with the falciform lobe, and those which associate the latter with the motor zone. Many of the recorded cases of anæsthesia in connection with lesions affecting the motor zone can be shown to have directly implicated also the falciform lobe or the sensory tracts; and we may legitimately assume, even if we cannot always demonstrate, a similar direct or indirect implication in the case of the others. Those who contend for at most only a slight blunting of the sensibility of the fingers and not of other parts, in connection with lesions of the motor zone, should take into consideration that this may be only a portion or a remnant of a general hemianæsthesia; for when a general hemianæsthesia is passing off the fingers are usually the last to recover their pristine sensibility, just as they are the last to recover their delicate movements after a general hemiplegia; and when a limb is motionless, cold, cedematous, or contractured, it may be a less delicate instrument of touch, more from imperfections in the instrument itself than in the centres of tactile perception.

“The question of the relation of cerebral lesions to affections of common sensibility is one of considerable practical importance in reference to regional diagnosis and operative surgery. I should regard a hemiplegia associated with hemianæsthesia either as a sign of lesion of the internal capsule or, if (as judged by the other indications above mentioned) invading the cortical motor zone, as a sign of implication also of the gyrus fornicatus or its connections with the internal capsule.

“Subcortical lesions of the motor zone produce symptoms not readily, if at all, distinguishable from lesions of the cortex itself. They are, perhaps, less frequently so limited, owing to the close relation and convergence of the various tracts toward the internal capsule, though occasionally they have the differentiated character of monoplegia. Theoretically, on experimental grounds, irritative lesions of the subcortical fibres should produce only tonic and not clonic, or epileptiform, spasms of the related muscular groups; but

practically this is not a reliable test, inasmuch as these lesions generally cause also cortical irritation and clonic convulsions of the usual type. More frequently, however, in subcortical than in cortical disease there is an absence of that tenderness on percussion or deep pressure which is a valuable confirmation of the regional diagnosis founded on the symptomatology. I have lately had under my care a case of subcortical tumor of the size of a hen's egg, situated at the upper extremity of the Rolandic zone, in which no pain whatever could be elicited by the deepest pressure or percussion over the region where it was supposed to be, and where the autopsy proved that it actually was. Usually, if not universally, lesions of the cortex, if at all irritative in character, are associated with this localized tenderness to percussion, though no pain may be spontaneously complained of by the patient.

"Though the clinical facts of irritative and destructive lesions of the post-frontal or oculo-motor zone are in accordance with the data of experimental physiology, they are not of themselves as yet sufficient to furnish precise regional diagnostic indications. The effects of unilateral destruction are not permanent, and hence an actual destructive lesion of this region may be entirely latent. The same is true of the marginal gyrus. Lesions may exist in all other portions of the hemisphere without producing obvious symptoms.

"Lesions of the prefrontal region cannot with certainty be diagnosed from the symptoms of the lesion as such. The irritable dementia not unfrequently observed in connection with such lesions cannot with certainty be distinguished from the general effects of other cerebral diseases, such as tumor, abscess, and the like. When a regional diagnosis is possible, it is founded mainly on a consideration of the symptoms induced by the not infrequent implication of the structures in the anterior fossa, together with the effects of extension backward upon the motor tracts.

"Lesions of the occipital region may remain latent, but if the lesion is such as to cause extensive destruction of the medullary fibres or optic radiations of the occipito-angular region,—and this would appear to be of specially frequent occurrence in connection with lesions of the mesial aspect and occipito-temporal convolutions (Nothnagel, Seguin),—we get homonymous hemianopsy toward the opposite side. A similar result may, however, be caused by a lesion of the optic tract or of the corpora geniculata.

"A sudden or apoplectiform onset is in favor of cerebral hemianopsia proper. Cerebral hemianopsia, pure and simple, is comparatively rare. Very frequently it is associated with a greater or less degree of hemianæsthesia (owing to the implication of the adjacent sensory tracts), slight hemiplegia or monoplegia, and occasional word-blindness. The visual fields are frequently concentrically contracted, and the dividing line commonly diverges away from the fixation-point into the blind side. I have suggested⁴⁷ that a line passing exactly through the fixation-point is in favor of tract lesion; but I admit that there are statements on record which seem opposed to this hypothesis. The point is one, however, which I think will well bear further investigation. A distinctive test between cerebral and optic-tract hemianopsia, which promises to be of great value, has been proposed by Wilbrand. In cerebral hemianopsia, a pencil of light thrown on the anæsthetic side causes the usual bilateral pupillary reaction, whereas if the lesion is in the tract no such reaction occurs. This test is somewhat difficult to carry out in practice, and special care must be taken to avoid the region of the *macula lutea*.

"Word-blindness and allied defects in visual ideation indicate destructive lesion of the angular gyrus of the left hemisphere. Not unfrequently irritative lesions of this region cause subjective ocular spectra or visual hallucinations.

"Word-deafness indicates destructive lesion affecting the superior temporal gyrus of the left hemisphere. Total deafness along with word-deafness may be caused by bilateral lesions of the same region.

"Lesions of the other portions of the temporal lobe are generally latent. Lesions of the hippocampal lobule calculated to cause irritation have given rise to subjective olfactory sensations. Assuming that there were facts indicative of disease of the hemisphere rather than of the olfactory nerves or tracts, such subjective sensations would be in favor of lesion implicating the hippocampal lobule.

"Abstracting from traumatic lesions the diagnosis of the *nature* of the disease, whether embolism, thrombosis, hæmorrhage, abscess, syphilis, tubercle, or other cerebral tumors, will depend on a consideration of various factors and symptoms which I do not purpose here to enter upon.

"The diagnosis is, however, not always easy; for even the most pathognomonic symptom, such as optic neuritis, in cerebral tumor may occasionally be absent.

"In reference to cerebral tumor in particular, the attention of neurologists is greatly needed toward the discovery and formulation of signs and symptoms which will serve as better guides than we at present possess in determining the exact nature of the tumor, and whether it is an isolable or infiltrating growth. The diagnosis is at present, unfortunately, in many cases only possible after death, or during the operation undertaken to remove it.

"II. May surgical operations be undertaken on the brain and its coverings with as great safety as any of the major operations in surgery?

"In reference to the second head, the opinions of surgeons have been very much divided. While some, up to a comparatively recent date, have looked upon trephining as a most dangerous and unjustifiable operation, others have regarded the operation *per se* as attended by comparatively little risk; attributing the fatal results (unfortunately all too frequent) to the conditions under which the operation was undertaken.

"Even those surgeons who, like Walsham, have regarded trephining as a comparatively safe operation *per se* have made the proviso that the membranes should not be opened or the brain itself operated upon. No one, so far as I know, had, up to a very recent date, advocated the deliberate opening of the cerebral membranes and operation on the brain itself for the relief of diseases localized by their symptomatology, entirely irrespective of traumatic influence. I was led to advocate this by a comparison of the results of the experiments which I had made on the brains of monkeys, without antiseptics, with those obtained by D. F. Yeo and myself under strictly antiseptic precautions, as published in the *British Medical Journal*, 1880. Whereas, in the first series of experiments, encephalitis or meningocephalitis was the invariable and almost always fatal result, in the second series no such result occurred (except once, when the antiseptic treatment was undoubtedly interfered with); and, even after the most formidable and occasionally twice or thrice repeated removals of portions of the brain, the animals continued in perfect health and free from first to last from fever or other constitutional disturbance. It could not be said that

experiments on monkeys were not comparable to those on man, or that these animals could bear operations without the risks attendant on similar operations in human beings, for the first series of experiments showed conclusively that monkeys are liable to precisely the same dangers as those which are the chief cause of death in man. I, therefore, having frequently before suggested, ventured formally to advocate operative procedure in such diseases as cerebral tumor, in respect to which all therapeutic remedies had hitherto proved unavailing.

“III. What diseases and conditions may be considered as justifying or demanding surgical interference with the view to their removal or amelioration ?

“There can, I think, be little question as to the advisability of trephining in primary cranial injuries, with symptoms of compression or localized paralysis or convulsions, with a view to removing depressed fractures, splinters of bone, or hæmorrhagic extravasations, on which these symptoms depend. For, when we consider the successful achievements recently reported by Macewen and Owen, and the fact that operations do not amount to more than 8.6 per cent. (Seydel); and when we remember, also, that even if without operative procedure some cases of compression apparently get well spontaneously, yet subsequently, often many years afterward, the patient may become epileptic or insane, we have good ground for regarding the operation as not only justified, but imperatively demanded as a preventive measure. Nor can there be any question as to the advisability of trephining with a view to the evacuation of traumatic abscess. For, though the mortality, even under antiseptics, appears to be very high,—amounting, according to Seydel, to 63.6 per cent.,—yet, as a spontaneous cure is practically unknown, death would be the inevitable result in all cases. Nor will there, I imagine, be any question as to the advisability of operation with a view to the evacuation of a collection of pus from any cause not traumatic, provided that the seat of the abscess can be accurately determined.

“The great majority of cerebral abscesses arise in connection with disease of the middle ear; but neither the fact nor the seat of the abscess is at all times clearly revealed by the symptomatology. We can, however, point to some brilliant examples of successful localization and evacuation of cerebral abscess, within

recent times, in which the localization was largely determined from external indications. Five cases, diagnosed from the symptomatology alone, and successfully treated, have been recorded, and there seems good reason for believing that equally successful cases will become more numerous in the future. While, however, there is little room for doubt as to the expediency of primary trephining for cranial injuries and their more or less immediate consequences, the question is different when we come to consider the question of secondary trephining with a view more especially to cure epilepsy or similar affections due to, or supposed to be due to, a cranial injury inflicted at a more or less distant date.

“Though trephining for this purpose dates even from pre-historic times, it is by no means settled how far, as a curative measure in the true sense of the word, it has proved successful. Apart from the risks of the operation itself,—which, according to Billings, has been attended by a mortality of 28 per cent. before antiseptics; but since the introduction of antiseptic treatment estimated by Seydel at 0 per cent.,—the proportion of cures of traumatic epilepsy has been estimated by Eccheverria at 65 per cent., by Walsham at 58 per cent., by König at 59 per cent., and by Seydel at 69.2 per cent. In 82 cases, carefully analyzed by Walsham, the primary nature of the lesion, where one for certainty was known to have occurred, was in more than half the cases a fracture, generally compound, with a depression. In the remainder the injury, when known, was various,—a scalp-wound, with possible bruising of bone, a contusion of the scalp, or a simple fracture,—whilst in many no history was obtained of the primary injury further than that the patient had a fall or received a blow on the head many years ago, often in childhood. In all the cases, with but few exceptions, there were some local indications for the use of the trephine. In a large majority there was a depression or cicatrix, tender or painful, either on pressure or otherwise; whilst in others there was a tender or painful spot without depression or other mark of former injury. In two-thirds of the cases a portion of the bone was found either depressed or variously altered or diseased. The dura mater in the greater number of cases appeared healthy, but in some was thickened, congested, vascular, adherent, or otherwise altered. In 16 nothing was found by the operation to account for the epilepsy. Six of these died, and in 2, even at the post-mortem examination,

no cause for the epilepsy could be discovered. The remaining 10 recovered from the operation, and all, with the exception of 3, were cured of the epilepsy and other symptoms for which they were trephined. In the 3 exceptions, 2 were improved, 1 was not improved. There is good reason for believing, however, that the number of real cures of traumatic epilepsy is not so great as these statistics would lead us to believe. Cases are too often set down as cured when, in reality, the patient has only survived the operation and remained free from fits for the comparatively short period intervening between the operation and his discharge from the hospital. But this may easily be the case after trephining, as after almost any surgical operation whatever; and yet the fits may recur in all their original frequency and intensity after a longer or shorter interval. It would not be safe to count on a cessation of the fits until at least a whole year should have elapsed since the date of the operation without any recurrence. Tested by this standard, there are exceedingly few cases on record in which it can be stated that the fits remained in abeyance after the operation. Of Walsham's 82 cases I can only find 12 of which this can be predicated. Hence, the cures of traumatic epilepsy by simple trephining, without opening the dura mater, would be placed not at 58 per cent., but at the much lower figure of 14.6 per cent. In 3 cases which have come under my own observation, in which epilepsy occurred after and apparently in consequence of injury to the head, and in which there were distinct signs of depression or local tenderness over the seat of injury, trephining was not of the slightest benefit.

"As the general result of my investigations and experience in reference to the question of trephining for traumatic epilepsy, I would say that unless (besides the mere history of a blow on the head) there is clear evidence of local injury in the shape of a distinct cicatrix or depression, and, in addition, some signs of localized irritation of the cortex at or near the site of injury, trephining is not indicated, and even then the result is extremely doubtful. The prospects of benefit are much greater when, in addition to trephining the skull, the whole of the cicatricial tissue and irritable portion of the brain-cortex are completely excised.

"The suggestion first made by Hughlings Jackson, that in cases of focal epilepsy, whether dependent on organic disease or not, the discharging lesion should be excised, has met with wide-

spread approval, and has led to a considerable number of operations with this object. Many of these have been so recently carried out that it is perhaps too soon to speak with confidence as to the ultimate issue. But, though the results have been on the whole very encouraging, I fear that it must be admitted that in some, at least, the expectations of permanent benefit have not been altogether realized. In one most striking case of that kind, mere trephining over the seat of the injury having proved unavailing, the right facial centre, the primary focus of discharge, was excised a year after the first operation. Notwithstanding this the fits have not ceased, and, having examined the boy the other day (December 3d), I find that he continues to have epileptiform attacks every night, varying in number from three to four up to twenty, and the remarkable circumstance is that the fits begin, as before, in the left angle of the mouth.

“The recurrence of the fits may be due (1) to incomplete excision of the focal irritation; (2) to the neighboring centres having become irritable and unstable like the original focus; (3) to a habit of discharge being established in the other hemisphere, or possibly in the lower centres. If the cause were the last mentioned, it would follow that the operation, to be successful, would have to be performed before what we might call an epileptiform habit had become established. If the cause were the second mentioned, the operation of excision would appear to offer little prospect of success, except at the expense of a considerable degree of paralysis. The question, then, will arise whether, if the epileptiform fits can only be cured by the establishment of extensive hemiplegia, aphasia, or other great impairment of faculty, the operation may not be considered as a greater evil than that for the cure of which it is intended.

“I am inclined to think that perhaps all the factors which I have mentioned may occasionally be operative: but it would seem that if the fits recurred in the same muscular groups as before, the chief reason must be imperfect excision of the focus of irritation. This would afford the most reasonable explanation of the recurrence of the fits in the left angle of the mouth in the case previously alluded to, and a similar explanation is applicable to some, at least, of the others on record. The lesson to be drawn from this, therefore, would be that in all cases there should be as

complete excision as possible of the whole centre from which the discharge proceeds.

"As an illustration of the establishment of an epileptiform habit, I would here mention the facts of a case which has been recently under my care at King's College Hospital. The patient, a young woman aged 25, had received a compound fracture of the skull and injury of the brain in the right parietal region, sixteen years previously, causing permanent hemiplegia of the left side. A year after the injury she began to have left-sided fits, which continued up to last year, when she was admitted into King's College Hospital. In April, 1888, Mr. Rose removed the thickened and depressed edges of the bone and broke up the adhesions, but no portion of the cortex was excised, as the parts had undergone such atrophy that there was considerable risk of opening into the lateral ventricle. The fits recurred, and now occasionally affected both sides. As certain portions of the scar still continued tender to pressure, a second operation was undertaken in July, and further portions of bone removed. The fits ceased for five months, but again recurred, this time affecting only the right side; the left side, to which previously the fits were confined, remaining quiescent.

"This case would seem to show that from a long-continued irritation limited to one hemisphere the other hemisphere (or perhaps lower centres) may take on what may be termed an epileptiform habit.

"As regards the treatment of cerebral tumors, these, in the great majority of instances, lead to death sooner or later; so that the condition must in all cases be considered desperate. Hence the question is not between the relative advantages of this or that mode of treatment, but between the possibility of removal by operation and certain and too often painful death. Even if we accept as accurate the statistics of Hale White, that at most only 10 per cent. of all cerebral tumors are amenable to operation, this is a fact which we may deplore; but it ought not to influence us against the endeavor to cure, if possible, the cases in which the tumor is so situated and of such a character as to admit of removal. And such cases are sufficiently numerous to come at some time or other under the cognizance of almost every physician. Already, in a comparatively short space of time, 18

cases at least have been operated upon. Of these, 7, including one cyst, have been successfully removed; of the remaining 11 cases (including 3 cases of tumor of the cerebellum, 5 of unremovable tumors—2 of them operated upon *in extremis*), 9 have died from various causes, including septic inflammation, cerebral œdema, or shock. This gives us a mortality of 50 per cent., or, as it should rather be put, a salvation of at least half the cases.

“Contrasted with the older statistics of trephining for all causes or any of the major operations in surgery, I think we have every reason to regard the surgical treatment of cerebral tumors as having achieved an encouraging measure of success. And there is reason to believe that greater successes may be attained in future, as the conditions of successful operation and after-treatment become better known. No cases, at least, should die of septic inflammation, to which we owe 2 of the fatal cases on record.

“Operation is advisable as soon as the nature of the disease has been clearly determined, and before the tumor has acquired such dimensions as to seriously impair the vital resistance and increase the dangers from shock, hæmorrhage, or cerebral œdema. Even very large tumors—from 3 to 4 ounces in weight, and a corresponding number of cubic inches measurement—have been successfully removed, and that, too, under conditions theoretically most unfavorable, such as the existence of a state of coma or semi-coma. Yet the risks are, no doubt, thereby greatly increased.

“Another reason for early operation is the uncertainty as to the nature of the tumor—whether isolable or infiltrating: for, while an infiltrating tumor is not absolutely unremovable, yet the prospect of permanently successful removal is greatly diminished if the tumor has already attained a considerable size.

“In the absence of definite indications as to the character of the tumor, and as to whether it is situated on, in, or beneath the cortex, trephining is, in my opinion, justifiable as a diagnostic measure; for if the tumor should, after all, not be removable, the risks of the operation itself are out of all proportion, much less than the evil of allowing a case to perish which the autopsy might prove to be one which could have been dealt with successfully.”

C. L. Dana,⁹ in his article on cranio-cerebral topography,

gives a very complete account of the subject. We commend the paper to neurologists as the best *résumé* of the subject extant in compact form. Anderson and Makins,^{6 July 12} also present an article on this subject.

Excitability of the Different Motor Regions in Newborn Animals.—Bechterew,^{75 Sept. 15} discussing the excitability of the different motor regions in newborn animals, states that the excitability first appears after the closing of the nerve-fibres going to the excited region with their medullary sheaths. In the newborn wolves, nerve-fibres covered with medullary layers, and therefore excitable, are found in the medulla oblongata, mainly in the inner and adjoining portion of the outer field of the formatio reticularis; in the pons the number of the medullated fibres of the formatio reticularis diminish rapidly near the reticular nucleus, whilst above the latter the medullated fibres are limited in number and adjoining the inner portions of the pons, consisting of the fibres going to the upper central nucleus and the fibres of the posterior longitudinal vesiculus. The posterior portion of the central capsule and that which lies under the sigmoidal convolution are excitable after the tenth to the thirteenth day. In a few days after birth, the fibres of the trapezoid body and the lateral lemniscus receive their medullary fibres, but the latter are not excitable; so that it may be assumed that they have no direct influence over the movements of the extremities.

The Thermo-Polypnœic Centre.—Isaac Ott,^{50 Feb.} communicates some investigations upon the thermo-polypnœic centre and thermotaxis. He states that this centre is situated in the gray matter about the third ventricle, in its anterior part, and that it acts reflexly, so that when heat is thrown on the body the sensory impulses excited by the heat are conveyed to the polypnœic centre, which stirs the respiration centre to throw off heat; so that it stands between heat production on the one side and heat dissipation on the other. The fall of the number of respirations by the heat after the removal of the polypnœic centre is due to an excitation of fibres running into the vagi at the respiratory centre. The normal temperature of the body is not necessarily dependent upon the amount of heat produced or dissipated, for human calorimetry shows that the heat production varies, but the temperature remains nearly the same, the relation of heat production to heat dissipation deciding

the temperature. The cortical centres, the cruciate and Sylvian, are thermotaxic. The four basal thermotaxic centres are situated as follows: One in the cordate nucleus, one in the gray matter beneath the cordate nucleus, another in the gray matter about the most anterior part of the third ventricle, and still another in the anterior end of the optic thalamus in the gray matter about the third ventricle. The author believes that these six thermotaxic centres are more circumscribed than Girard, of Genoa, believes, and that they are neither thermo-inhibitory nor thermo-excitor, but thermotaxic; that is, they maintain the balance between the heat production and heat dissipation, so that the temperature is kept normal. In fever neither increased production nor increased dissipation, nor high temperature, are necessary; but fever is mainly a disease of thermotaxis, a disorder of the four basal thermotaxic centres. It is true that in septic fever, in its initial stage, heat production usually runs temporarily ahead of heat dissipation, but, exceptionally, both are immediately diminished. Antipyretics do not necessarily inhibit or excite heat production, nor yet dissipation, but act upon the thermotaxic centres disordered by fever agents to restore order or normal thermotaxis. Chittenden's careful researches prove that in healthy hungry rabbits moderate doses of quinine exercise, at most, only a very slight depressing influence of body-temperature, and have but a minimum effect upon the production of carbonic acid. In the discussion that followed, Dana pertinently raised the question as to what interpretation we should make of the six thermotaxic centres described, and referred to a case of his own in which, although there was no cerebrum, basic ganglia, or cerebellum, and only part of the pons, yet the temperature was normal.

The Medullated Fibres in the Human Optic Chiasm.—Bernheimer, ⁵⁴_{Sept. 15} investigating the development and course of the medullated fibres in the human optic chiasm, has found the Weigert's method perfectly reliable, contrary to the statements of Singer and Muenzer. It is stated that in the lower half of the chiasm probably only run completely-crossed fibres, while crossed and uncrossed fibres run in the upper half; in the latter situation the crossed fibres considerably exceed the uncrossed in number. The uncrossed fibres do not run in a compact bundle. During the whole of embryo life to the twenty-ninth week no medullary layer is to be

found in the chiasm, its roots, or its continuations, and the medulla appears only between the twenty-ninth and thirtieth weeks, increasing slowly in the two following weeks. At this period the larger implication of the tract-fibres is very distinct, as well as the degrees of the medullary formation near the optic nerve.

Palm Reflex.—Boynton Lee,⁶_{Dec. 22, '90} calls attention to what he calls a palm reflex, as something that may prove to be of diagnostic value. He obtained it by pressing firmly upon the pisiform bone with the thumb of the disengaged hand, and there appears to ensue a reflex contraction of the palmaris brevis. It may in some instances be obtained by pinching the skin in the same locality. He first observed it after a traumatic synovitis in the joint, between the pisiform and cuneiform bones, in tapping the joint surfaces together, when the effusion was first disappearing. He states that he has seldom failed to get this reflex in experimenting with the palms of very many people.

Supra- and Sub- dural Hæmorrhage.—Mittenzweig⁷⁵_{Apr. 1} calls attention to the frequency with which subdural hæmorrhage arises from the veins running an abnormal course from the longitudinal sinus. Huguenin had called attention to the fact that these veins were often in a dilated, varicose state, with walls thin and easily ruptured, and the author thinks that their abnormal course increases their predisposition to rupture. He examined 200 dura maters, finding in 59 an abnormal course of the anterior veins from the longitudinal sinus, and only 9 abnormally disturbed veins in the posterior regions. The abnormality of this distribution consisted in the veins arising from the arachnoid about 3 to 4 centimetres (1.18 to 1.60 inches) from the longitudinal sinus, and then, penetrating the dura once, they enter the longitudinal sinus; so that they lie exposed a short distance in passing from the arachnoid to the dura, and in this exposed position they can easily be torn, as the brain membranes are elastic. The reasons for this abnormal distribution—in children at least—he thinks are as follow: The two laminæ of the dura are only loosely united and have numerous veins between them, and between these veins are the cerebral veins from the numerous anastomoses, one of which may carry the blood to the longitudinal sinus, while the original central nature of the vein may become destroyed.

F. X. Dercum⁹_{Mar. 20} reported a case of supra-dural hæmorrhage.

A man of about 30 years was brought to the hospital unconscious, having been found lying in an open lot. Temperature subnormal, registering at one time 95° F. (35° C.); face flushed and dusky; breath labored and stertorous, and at times resembling the Cheyne-Stokes; the lips and cheek on the right side were puffed in and out, and the right nostril dilated. The right side seemed normal. The mouth was not distinctly drawn. Both hands and arms were firmly flexed and crossed over the chest, and were decidedly rigid. The legs were also flexed in extension, with some turning in of the feet. The head was turned to the right, a marked effort being required to rotate it toward the outward side. The right pupil was widely dilated, while the right eye was directed outward, as if held there by spasm of the external rectus. The left pupil seemed unaffected. Both were insensitive to light. The conjunctiva and the skin over the entire body were insensitive. The arms could be partially extended and had occasionally jerky movements. The patient vomited freely, smelling of whisky. No albuminuria; pulse weak and intermittent. A small scratch or abrasion was found to the right and above the occipital protuberance. No bleeding had occurred from eyes or nostrils. The condition remained unchanged for several hours, but the weakness increased during the day and death occurred. At the autopsy, beneath the bruise previously observed, the inner surface of the scalp and periosteum were ecchymosed. A fracture was detected beginning a little in front of the lambdoid suture and extending across the latter, evidently a fracture of both tables, on the outer surface being about an inch (25 millimetres) in length, linear in shape, on the inner table being more extensive and extending in three directions. An immense clot was found lying upon the dura, upon the side of and beneath the fracture, over the lateral aspect of the superior and inferior parietal lobes, first and second temporal convolutions, and the anterior extremity of the lateral aspect of the occipital lobe. The anterior limit of the clot was about $\frac{1}{2}$ to 1 inch (13 to 25 millimetres) back of the fissure of Rolando, while its posterior limit was from $\frac{1}{2}$ to 1 inch (13 to 25 millimetres) of the apex of the occipital lobe; in its middle convolution the clot was fully an inch (25 millimetres) in thickness. There were numerous ecchymotic spots and areas in the pia and arachnoid of the base, and almost everywhere throughout the brain. No hæm-

orrhage existed in the ventricles or ganglia. On the ventricular surface of the right cordate nucleus was an area of very superficial yellow softening, $\frac{1}{2}$ inch (13 millimetres) in length, $\frac{1}{4}$ inch (6 millimetres) in breadth, and 3 or 4 lines in depth.

Infantile Cerebral Hæmorrhage.—Collier,² reports two interesting cases of cerebral hæmorrhage in children. The first, aged 13, was admitted into the Radcliffe Infirmary with symptoms of heart disease, dyspnœa, swelling of the feet, and pain over the cardiac region, which had come on about a month previously. Had never had rheumatism, but had apparently had heart trouble at varying intervals for many years past. The heart was considerably enlarged, and there was a large double murmur at the apex. The temperature varied between normal and 101.4° F. (38.55° C.), occasionally falling and keeping to nearly normal for two or three days, and then rising and oscillating for some time. The diagnosis was ulcerative endocarditis. About six weeks after admission he had a convulsion, lasting a few minutes, when he became semi-comatose. An hour later another convulsion followed, and profound coma, with stertorous breathing and pupils widely dilated, marked rigidity, and flexion of both arms, with clonic spasms; the legs were also affected, but in lesser degree. He remained in this condition for about four hours, gradually becoming more and more cyanosed, and died asphyxiated. Numerous warty vegetations were found at the free edge of the cusps of the mitral valve. The other valves were healthy. The spleen was enormously enlarged, weighing 21½ ounces (668 grammes), and had a number of recent infarcts. The kidneys also showed several infarcts, but of an older date. An enormous recent blood-clot was found in the right supra-marginal convolution, not communicating with the lateral ventricle, and weighing 2 ounces (62 grammes) on removal. The exact source of the hæmorrhage was not discovered, although the author regards it as due to embolism. The second case was 6½ years old, admitted into the Infirmary on March 2, dying eight days after admission. Her illness had begun about three weeks before with headache, vomiting, weakness of the legs and arms, and an increasing disinclination to move about. On admission there was decided ptosis of the right side, with paresis of the muscles of the left side of the face; loss of power and some rigidity in the left arm and both legs, the left more than the

right; unable to stand without support; pupils equal and reacting to light; she was quite sensible, and complained of severe frontal and vertical headache. After admission all the symptoms increased in severity. The paralysis grew more marked. There was well-marked double optic neuritis. The temperature rose a few hours before death to 108° F. (42.22° C.). Post-mortem the pons is much enlarged, especially on the right, occupying the posterior half of the inter-peduncular space. Covering the posterior peripheral space was a quantity of flocculent lymph and gelatinous material resembling blood-clot. On washing this away a small vein, about the size of a No. 1 English catheter, was found completely blocked by a dark clot. At the inner margin of the right crus a blood-clot was found about the size of a large cherry, which had pushed the crus somewhat outward and had partly eroded its substance; and this clot was continuous with a larger one occupying the greater part of the substance of the right half of the pons. No disease of the bones of the skull or any other part of the body was discovered. Admitting the obscurity of the cause of the hæmorrhage, the author yet thinks that it was a slow effusion. It is to be regretted that a more detailed examination was not made.

Idiopathic Thrombosis of Cerebral Sinuses.—Powell,⁶ reports a case of idiopathic thrombosis of the cerebral sinuses and veins of Galen in a female of 20. She was admitted to the hospital in a comatose condition. She is said to have been always very pale and delicate. Her general health seems to have been fair. Her present illness had begun seven days before admission, in an attack of vomiting. The next day she felt much as usual, but two days afterward the vomiting returned, with great pain all over the head. In this condition she remained until the 18th, when the headache and sickness ceased; so that she was able to get up toward evening, feeling much better. She was restless that night, however, but seemed brighter the next morning. When food was brought to her it was observed that she was paler than usual, had a vacant look, with partially-closed eyes, and mouth drawn to one side (right?). She was quite unconscious. There was left hemiplegia. On admission the decubitus was found to be dorsal; the face flushed; complete coma; eyelids drooping, but not quite closed; eyes directed downward, the right somewhat

inward; movements of eyeballs often independent of each other; pupils equal, rather small, not in the same plane; occasionally raises both eyelids evenly and moves the eyes languidly in various directions. Respiration 38, occasionally interrupted by a deep sigh. Size and position of heart normal; sounds those of health; over pulmonary area hæmic bruit of varying intensity. Pulse 72, equal and regular; temperature night before, 98.4° F. (34.11° C.); in morning, 104.2° F. (40.11° C.); involuntary urinations, no albuminuria or diabetes; limbs extended, with a tendency to pronation; rigidity of legs in standing, and aggravated by all attempts at passive movements; no clonic spasm; knee-jerks exaggerated; toes generally markedly extended; during tonic spasms flexion and adduction of the shoulder, with extension of the elbow and digits; the arms and hand always affected simultaneously; no clonic spasm. Patient died on day of admission. The entire brain, especially the right half, felt abnormally soft, and the convolutions were flattened. A firm, contracted, ante-mortem clot was found in the superior longitudinal sinus. The straight sinus also contained a firm clot. All the other sinuses were normal, as were also the dura mater and the arteries. The right central ovale majus was studded with minute multiple hæmorrhages. The right corpus striatum and optic thalamus were in a state of great softening. There had been capillary oozing from the right lateral ventricle. The ventricles were not dilated and contained no fluid. The left central ovale contained a very few minute hæmorrhages. The veins of Galen were much distended and rod-like, and were both completely filled by a firm ante-mortem clot. There was no marked injection of the meninges, nor was there any excess of subarachnoid fluid. No local cause for the thrombosis was discovered anywhere, although the most minute search was instituted. All the other organs of the body were normal to the naked eye.

Traumatic Meningeal Hæmorrhage.—John Croft⁴⁰ records a case of traumatic meningeal hæmorrhage, without fracture of the skull, in which recovery followed trephining and removal of clot.

Courmant²¹¹ reports a case of meningeal hæmorrhage occasioned by a lesion of the middle meningeal artery.

Spencer and Horsley² present an important article on the control of hæmorrhage from the middle cerebral artery and its branches by compression of the common carotid.

Lloyd¹¹² reports an interesting case of hæmorrhage into the pons.

Bruno³⁶⁸_{R.S.D.} has observed the following multiple lesion of cranial nerves after a fracture of the base: A man of 27 was severely injured about the head, especially on the left side, was unconscious for five days; there was also right facial paralysis, hæmorrhage from the right ear, total mydriasis on the left, left ptosis and neuro-paralytic keratitis. Eleven weeks after the injury the following symptoms appeared: paralysis on the left of the trochlear abducens and total paralysis of the sensory and motor fibres of the trigeminus; on the right, paresis of the abducens, total paralysis of the facial, and complete reaction of degeneration. There was no disturbance in the territory of the glosso-pharyngeal. Sense of taste was normal upon the left half of the tongue,—that is, upon the side of the trigeminal paralysis,—but was absolutely lacking on the right side of the tongue, both anteriorly and posteriorly. A diagnosis was made of a fracture of the base, with injury of the second, third, fourth, fifth, and sixth nerves.

Meyer,⁴_{J.V.} in presenting a 5-year-old boy, who had symptoms of intra-cranial pressure (headache, emesis, retardation of pulse, constipation, choked disks, paralysis of the right facial nerve and the right abducens nerve), called attention to a loud, musical sound occasionally heard over the skull, synchronous with the cardiac systole,—a symptom which has not heretofore been described. Meyer regarded the sound as of arterial origin, arising either from an aneurism or an angioma, or caused by the pressure of a tumor upon the artery. The intra-cranial tumor was diagnosed as being at the base about the posterior edge of the pons. In the discussion that followed, Oppenheim spoke of a case described by Gerhardt in which a similar sound was heard, with aneurism of the arteries of the posterior fossa. Bernhardt alluded to a case of Schultze's, in which there was an aneurism pressing upon the facial nerve at its entrance into the auditory canal. But in this case there was only a spasm of the facial, and not a paralysis. The sound heard by Meyer was so loud that it was not necessary to apply the stethoscope directly to the skull, and, although it was systolic, there was not the slightest cardiac sound to be detected. At first it was heard increasing distinctly from the vertex down to the left ear, but it afterward grew more distinct upon the right side.

Henoch expressed a doubt as to whether it was an aneurism, as these were rare in children, and such a sudden appearance of an aneurism was hardly to be thought of without trauma; and he therefore would rather believe that it was due to a sarcoma, the temporary disappearance of the sound being due to the variations in the growth of the tumor.

Tatham⁶_{Dec. 1, 98} exhibited a man of 38 who had fallen in a fit, striking his head and forcibly flexing his neck. He was unconscious until the next day, with complete paralysis of motion and sensation below the neck. Respiration and deglutition were difficult, and there was urinary and fæcal incontinence. He remained in this state for over three months, taking only slight nourishment. After this, movement and sensation began to appear in the right fingers and toes, and steadily increased, so that at the end of fourteen months he was able to stand. He can now walk 10 or 12 miles, although he cannot yet follow his occupation. There is still some thickening about the third cervical vertebræ.

Cerebral Œdema.—Huguenin²¹⁴_{Jan. 1} writes a very interesting article upon cerebral œdema, which will well repay perusal in the original. He very truly says that we should never speak of cerebral œdema alone, as with it always exists an œdema of the subpial space and the ventricles. Two classes of œdema are to be distinguished,—inflammatory and non-inflammatory. The author deals only with the latter, as the etiology of the former is well understood; so that we know of its perforating traumata of the skull, tumor, abscess, hæmorrhages, hæmorrhagic infarcts, and certain infectious diseases (as in scarlatina). The causes of non-inflammatory œdema are by no means so well understood. The author believes that no fatal œdema of the brain can be brought about by circulatory disturbances as long as the vessels and the relations to one another and the structures in the skull-cavity are normal; but circulatory disturbances, capable of regulation under normal circumstances, may cause fatal œdema if old lesions of the skull and brain are present, such as obstruction of the flow of the lymph (as from lesions in the subpial and subdural spaces or pachyionian granulations or arachnoid lesions), chronic intra-cranial pressure or narrowing of the skull, or lack of development, diseases of the brain causing more or less intra-cranial pressure. The author does not believe that œdema can result from pure cerebral

congestion, either in children or adults. He enters into a long physiological argument to support this opinion, and then adduces cases. His own experience warrants him in saying that what was diagnosed in children as cerebral hyperæmia, œdema, or slight hydrocephalus, was generally proven to be imperfect meningitis, generally of an infectious character, *i.e.*, with streptococci of meningitis. Occasionally fatal œdema of a congestive nature can occur in children, he believes, but rarely; and he cites the case of a child dying from chronic meningitis with great œdema. He also cites cases of œdema in paralytic dementia, following surgical removal of cranial tumor.

Alternate Anæsthesia.—Paget,² reports a rare case of alternate partial anæsthesia. Male, aged 59, had sudden paralytic seizure, without loss of consciousness, resulting in paresis of entire left side, which felt numb; left ptosis, persistent vertigo, diplopia, nausea, phlegm collecting in the left side of the throat, tongue furred, and hiccough. This attack had been preceded by severe pain in the left side of the head during the previous night, and for some twelve months previous he had suffered with various vague nervous symptoms. Three days after attack left, conjunctivitis appeared, and the left nostril became obstructed with mucus, these symptoms subsiding in the course of a few days. After this seizure the vertigo became very distressing, so as to prevent his rising, and this continued for several weeks. Lying on the left side, however, even then caused vertigo, as it had for some twelve months before the seizure. The sensibility of the skin was persistently impaired in the left side of the face, the right side of the trunk, and the right arm and leg, being normal elsewhere. The sensibility to heat and cold was very greatly impaired in these regions, the susceptibility to pain was wholly lost, whilst the tactile sensibility was so little impaired that the lightest touch was readily perceived. Objects applied to the analgesic regions somewhat warm, none of them either very cold or very hot. These, the temperature of the limb being 72° F. (22.22° C.), and that at his right hand 96° F. (35.55° C.), and the left hand 97° F. (36.11° C.), water at 68° F. (20° C.), and 72° F. (22.22° C.), seemed in each case warm to the right hand and cool to the left, and the glasses containing the water seemed warm when applied to the left cheek or forehead, but cool when applied to the right cheek.

Tickling and galvanism were normally felt in both hands. Sense of taste was a little impaired. The left nostril was impaired in its sensibility, both common and special. Patient could not stand loud noises; nearly fell upon hearing a sudden peal from an organ.

Athetosis.—Löwenthal⁸⁹_{Apr.11} reports a case of acute hemiparesis with hemi-athetotic movements, following excessive use of the arms for two days and two nights in a handicraft. The nature of the lesion causing the symptoms was a matter of speculation purely.

Cephalic Tetanus.—Lannois²¹¹_{Nov.10} reports a case of cephalic tetanus with facial paralysis, with an autopsy disclosing simply a congested condition of the cerebrum of the basal ganglia, the histological examination of the facial nerves being said to have been negative. Cultures and inoculation were also without result. The immediate exciting cause seems to have been a trauma, causing a scar at the outer angle of the left eye.

Cortical Centre.—Rossbach⁷⁵_{July 1} reports the following case of interest as bearing upon the cortical centre. The patient had had a left-sided facial paresis, a left-sided lingual atrophy, and left-sided paralysis of the vocal cords of ten years' duration.

At the autopsy a so-called encephalitis subcorticalis was found of the right second parietal lobule, a posterior central convolution at its lower part above the operculum, and of the posterior convolution of the island of Riel. In the medulla oblongata there was found only an atrophy of the left hypoglossus nucleus. The nuclei of the facial, the vagus and the accessory, were healthy, as were also the corresponding nerves, especially the recurrent, and the muscles of the larynx and trachea.

Hemianopsia.—William Noyes²⁴²_{Jan. 1892} reports a case of lateral hemianopsia with lesion of the cuneus. Male, aged 52, subject to so-called migraine, with vomiting, for previous ten years, denying venereal disease, finds, suddenly, after a severe attack of migraine, with violent vomiting, that he is blind to the left. No paralytic phenomena or unconsciousness; fever, for a week or ten days, ran from 100° to 102° F. (37.77° to 38.88° C.), and after this period sight improved, but the blindness to the left remained. About two months afterward, in the midst of a debate, without unconsciousness or paralysis, suddenly found himself confused in speech. Was able to write at once after the attack. There was a slight hemiparesis, gradually improved, together with the speech. No hemi-

anæsthesia. Pupils, ocular muscles, and fundus normal. Reads easily with presbyopic glasses. Has typical lateral hemianopsia to the left, with a concentric limitation of nasal half-field of the left eye. Patient improved somewhat, but about a year afterward again became speechless and had right monoplegia. His speech never returned altogether, and his gait is said to have become somewhat feeble. About eighteen months afterward he had a convulsion and was unconscious, and had another one some months afterward, from which date his mental powers failed gradually and he finally became, in the course of some six months, demented and paretic. The accompanying photographs of the two hemispheres were taken after the brain had been thoroughly hardened in Miller's fluid. The convolutions and the right cuneus had undergone considerable atrophy, the right hemisphere, as a whole, having become smaller than the left. There is no visible lesion in the left cuneus, the convolutions retaining their normal size, the roughened surface in the photograph being due to an accidental abrasion of the hardened brain. No examination was made of the nerve-tracts leading from the cuneus or of the internal structures.

Brachial Monoplegia.—Chabrely¹⁸⁸ reports an interesting case of what he calls brachial monoplegia with hemianæsthesia, due to a softening in the motor zones and the corresponding sensory ones, but the history of which does not warrant any such localization of the symptoms. The right upper extremity was inert and insensible. There existed a hyperæsthesia very marked on the side of the right inferior extremity, which was, nevertheless, capable of executing certain spontaneous movements, and which was not impaired in strength. Sensation of pinching was also abolished in half of the tongue, and the face on the right side. Sensation and movement were normal on the left side. The left upper extremity was agitated by incessant movements, not choreic, with carphology without athetosis. The right tendon reflex abolished; impossible to determine the left on account of the stiffness of the limb. Cremaster reflex abolished on both sides. Plantar tickling abolished in the right, normal on the left. The anæsthesia afterward became complete over the whole right side of the body. At autopsy it was found that the cerebral arteries were very atheromatous and the left Sylvian contained a clot. Over the left hemisphere there was an area of white softening, over which the membranes were

very adherent. This softening occupied the middle third of the ascending frontal and parietal convolutions, and a part of their lower third, as well as the fissure of Rolando; in slighter degree the adjacent territory of the parietal lobe attains anteriorly the foot of the third frontal, extending downward to the external capsule and to the posterior fibres of the internal capsule.

Hemiplegia.—B. Sachs¹_{Mar. 22} exhibited a case of hemiplegia with a remarkably perfect associated movement on the left side. If patient attempted to raise his sound arm, the paralyzed arm would also be raised; in lifting a glass from the table with his left hand, the other would perform the same movements, which were very marked in buttoning and unbuttoning his clothes, when the paretic hand would make the same motions.

F. Peterson¹_{Apr. 5} has taken careful measurements in 20 cases of infantile cerebral hemiplegia, as the result of which it was made evident that the average measurement of the skulls was below the normal in nearly every measurement, while in 14 of the 19 cases the variation was outside of the physiological limits in some of the arcs or diameters. In all the skull was more or less diminished in size on the side opposite the paralysis. There was a pronounced tendency to diminution in all dimensions and capacity, so marked in the transverse diameters as to bring these heads under the class of leptocephalus. While all the heads are below the normal averages, more than 73 per cent. are actually below the lowest limit of physiological variations in some of their dimensions.

D'Espine¹⁹⁷_{Mar. 22} writes an excellent compilatory article upon infantile spasmodic hemiplegia and infantile spasmodic tabes.

Walter Pearce²²_{May 1} tells of a very interesting case of hysterical hemiplegia.

Chazarin²⁴_{May 12} details a so-called cure by metallic disks of an attack simulating apoplexy in a child of 6 years. There was a sudden inability to speak, without loss of consciousness, the mouth deviating to the left, whilst the right side of the face was paralyzed; the corresponding cheek was relaxed, the saliva filling the mouth and dribbling away. The child could sit up and move his limbs. The grandmother and father carried him to an apothecary, by whom he was sent to the author. By this time he became unsteady, and convulsive movements of the right arm ensued, after which the hemiplegia of the right side became complete. Soon

afterward there was entire loss of voluntary movements; the eyes became immobile, the saliva trickling into the throat, causing symptoms of suffocation, and the child was thought to be dead. When Chazarin arrived, about three-quarters of an hour after the onset, there was general muscular flaccidity. Four metallic disks, 6.50 centimetres (2.53 inches) in diameter, were applied as follows: One positive disk was applied to the left temple, one negative disk to the right temple, the two others in the lower vertebral region; the positive disk to the left and the negative to the right, this being equivalent, in the opinion of the writer, to the application of a transverse continuous current, of which the electrodes would occupy the position of the disks or of a longitudinal current in an inverse sense. In two minutes a change was manifest. The approximation of a candle to the eyes showed the pupils contracting and the lids lifting; soon afterward there were some movements of the muscles of the face, then the head turned to the left and the arm on the same side moved. Several seconds more and the child responded when spoken to, and gave his left hand when requested; but the aphasia and the right hemiplegia persisted. An hour afterward the child answered "yes" to a question. He then went to sleep for a half-hour, and shortly afterward speech entirely returned and the hemiplegia disappeared. The only defect in this interesting observation—and that we fear is a fatal one—is that there is no proof whatsoever that the application of the metallic disks had anything to do with the recovery, inasmuch as the symptoms might have been due to shock from some slight lesion, and that the improvement was due to the disappearance of the shock rather than to the metallic disks.

APHASIA AND ALLIED STATES.

M. Allen Starr, ⁴⁷analyzing 50 cases of sensory aphasia in which Broca's centre was not diseased, arrives at the following conclusions: In all these cases some form of sensory aphasia was present, and in all the lesion lay in the lower posterior third of the brain. The convolutions were found affected in the following order: The first temporal in 38, the second temporal in 27, the inferior parietal in 21, the angular gyrus in 25, the supra-marginal gyrus in 12, the occipital lobe in 19. In 7 of the cases pure word-deafness was present. The patients had lost the power

to understand speech when heard, though able to read, to talk, and to write. In all of these cases the lesion was limited to the first and second temporal convolutions in their posterior two-thirds. In 11 of the cases pure word-blindness was present. The patients had lost the power to understand words when seen, though able to understand speech and to talk. In 2 of these cases the patients were able to write or copy, but in the remainder they had lost the power or were not tested. In these cases the lesion was not uniformly in one location. It affected the angular gyrus in 5 cases, the occipital lobe in 5 cases, the temporal convolution in 3, the inferior parietal region in 3, and the supra-marginal gyrus in 2. By the inferior parietal convolutions are indicated those gyri which lie between the supra-marginal gyrus and the angular gyrus, and which are between the intra-parietal sulcus and the first temporal sulcus. The area lying between P 2 and P 2' in Ecker's diagram is reproduced by Ferrier.¹²⁴⁸_{p. 471} In 25 of the cases the power of recalling words and to name objects was impaired. This occurred in some of the cases of pure word-deafness and also in some of pure word-blindness. In some of these cases the power to recognize the word or name of the object when suggested by another person was preserved, and the lesion in these cases varied widely, involving any or all of the various gyri included in the sensory speech-area or the sub-cortical tracts beneath them. In 7 of the cases word-deafness and word-blindness were present together, and yet the use of language was not lost. In these cases the lesion lay in the temporal convolutions alone in 2 cases, and in the remainder it extended posteriorly, involving the inferior parietal, angular, and occipital convolutions. In 22 of the cases word-deafness and word-blindness were accompanied by more or less impairment in the power to talk. The difficulty in talking in 2 of the cases was the difficulty in the power of pronunciation, such as occurs from lesion of Broca's centre. In all others it consisted in a use of long words or unintelligent phrases, a series of words whose connection was deficient. Paraphasia is therefore the usual accompaniment of sensory aphasia. In these cases the lesion was wide in extent, involving the temporal and parietal convolutions. It was impossible to ascertain any constant pathological difference between aphasia without and with paraphasia.

Nor would the power to repeat words one after another seem

to depend upon the relative situation of the lesion, as might be supposed from Wernicke's assertion that this defect appears with paraphasia, when the temporo-frontal tract is involved, for paraphasia with inability to repeat words was found in a few cases where the lesion lay too far back to affect this tract. Paraphasia, therefore, may be caused by lesions in various locations. The writer thinks it evident that word-deafness is due to a lesion of the first and second temporal convolutions, and also that word-blindness may be produced by lesions lying in the region of the inferior parietal lobule, or extending over, anteriorly from it, into the temporal region, or, posteriorly, into the angular gyrus and occipital lobe. He also believes that, while failure to recognize a word heard implies destruction of the temporal cortical area, failure to recall the name of an object seen implies the destruction of the temporo-occipital association tract in the subcortical white matter. In 12 of the cases here collected, psychical blindness was present, and in 6 of these hemianopsia was also present. In all these cases the occipital lobe was diseased, twice with the adjacent angular gyrus.

The author says: "If the lesion be extensive enough to involve the cuneus, or deep enough to reach the visual tract to the cuneus as it passes beneath the angular gyrus and convexity of the occipital lobe, it will produce hemianopsia; if not, actual blindness may not accompany psychical blindness. In either case it is found that when things are not recognized they cannot be named when seen." When limited in extent and strictly cortical, the lesion was found in 5 cases in the angular gyrus and in the inferior parietal lobule. It is here, therefore, that the visual memory-pictures lie, according to the author; and he states that in all the cases in this collection in which the lesion involved this area, and in which reading was tested, there was word-blindness. The author believes that this review warrants the recognition of many of the numerous forms of aphasia recently discovered, and that there are aphasias of association as well as cortical aphasias. It is necessary to recognize aphasia from lesion of the visual, auditory, or occipital temporal tract (verbal or auditory amnesia); aphasia from lesions within the occipital lobe, giving rise to word-blindness with visual amnesia; aphasia from lesions in the temporo-parietal region, giving rise to word-blindness with word-deafness; as well as the

simpler forms of cortical aphasia known as word-deafness, word-blindness, agraphia, and motor aphasia.

Eisenlohr⁶⁹_{Sept. 2} reports a typical case of Wernicke's sensory aphasia with word-deafness and word-blindness, the autopsy disclosing one abscess implicating the tegmentum, the subthalamic region, the optic thalamus, the neighboring portions of the internal capsule and the lenticular nucleus, and another abscess in the posterior portion of the cordate nucleus, the neighboring portions of the corona radiata, the lenticular nucleus, and the internal capsule. The other portions of the brain were intact.

H. C. Wood⁹_{May} and Robertson²¹³_{May} report cases of right-sided aphasia in a left-handed person.

Abasia.—Charcot¹⁴_{Apr. 10} delivered a lecture upon abasia of a tremulous type, following poisoning by oxide of carbon.

Abasie, or abasie-astisie, was described by Bloch.¹⁴ In addition to the characteristic walk of this disease, the patient had a certain tremor, causing the gait to resemble somewhat that of so-called spastic paraplegia.

TUMORS.

Iespinasse¹⁸⁸_{Sept. 15} reports a tumor of the left lobe of the cerebellum. A female of 33 entered the hospital complaining of violent headache of some three months' duration. She had also had several losses of consciousness, with tendency to falling, with nausea and occasional vomiting. In the hospital the headache was constant, without special localization, although it was greatest in the nucha. There was no evening exacerbation, cranial exostosis, or deformity. Nothing abnormal about the facial muscles, or tongue, or the facial sensibility. The trunk and the extremities were also normal. The gait was hesitating, with vertigo and tendency to falling. The losses of consciousness continued, emesis, but without convulsions or contractures. There was slight pulmonary congestion, photophobia, slight pupillary inequality, no limitation of the visual field, or achromatopsia. There were loud sounds in the ears at the moment of the crises. Taste and smell were normal. There was profuse sweating during the crises, but no cutaneous eruption or erythema. The memory and intelligence were well-preserved. The character was eccentric and melancholy. Death was sudden by syncope. The left occipital fossa

was occupied by an orange-sized tumor, causing softening of the left lobe of the cerebellum. Microscopical nature not determined.

Railton,⁹⁰ reports a tubercular tumor of the right lobe of the cerebellum. A boy of 5 had begun to complain of frontal headache some three months before, with cerebral vomiting and a tendency to stagger and fall. There had been no convulsions or intellectual impairment. He could not stand without assistance, staggered greatly in walking, and at the same time there was some slight rigidity of both upper and lower limbs. Muscular power was normal, also sensation and the superficial reflexes; but the knee-jerks were somewhat exaggerated, although no ankle-clonus was obtained. There was no squinting, nystagmus, or deafness. There was marked haziness of the optic disks, the pupil was somewhat dilated, but reacted to light. Heart, lungs, liver, spleen, kidneys, bladder, and bowels were normal. In the course of a month he became blind, and walking became almost impossible; spastic condition was more decided, and slight tremor appeared in the hands of intentional type. Five months after onset ankle-clonus became apparent and knee-jerks exaggerated; vomiting appeared almost daily. He commenced to fall, generally to the left. There were several epileptiform attacks, with tonic spasm of the right arm and leg, and unconsciousness. At the post-mortem there was found to be a tuberculous tumor, walnut-sized, in the posterior inferior part of the right lobe of the cerebellum.

M. A. Starr,⁹¹ presented a specimen of inter-peduncular myxosarcoma. It lay in the middle cranial fossa, in the median line separating the crura cerebri, extending into the lateral ventricles and separating widely the cordate nuclei and the optic thalami. The patient was 21 months old. When 13 months old a lateral nystagmus had been observed in both eyes, varying from time to time. Knapp and Roosa found a slight pallor of the optic disks, which they considered normal. Exophthalmus developed later, gradually increasing until death. Convergence of the eyes was impossible, although no paralysis of a cranial nerve was discoverable. The reflexes of the iris were lost. The child became unable to walk. The knee-jerks were exaggerated; there was ankle-clonus and typical spastic rigidity. Finally, the trunk could not be supported, nor, later, the head. There was gradual emaciation; no apparent headache; occasional congestion of the scalp; atrophy

of the optic disks; no blindness or hemiopia, or aphasia, as far as could be ascertained in so young a child. Ataxia of the arms developed, but without paresis. Vomiting and Cheyne-Stokes respiration came on, and the child died in nine hours. The tumor was not localized *intra vitam*, and the diagnosis of an intra-cranial tumor was not made until the symptoms were well established.

Joseph Zeit,¹¹⁴_{B.M.B.2.4} in an article upon tumors of the fourth ventricle, reports 2 cases. In the first, a male of 22, there had been for six years intermittent cephalalgia, with vomiting and loss of consciousness; no motor or sensory disturbances; syncope in attempting to stand or walk. In the further progress of the case there was at first improvement, and then the symptoms grew worse. There was difficulty of deglutition, vomiting, slight glosso-pharyngeal and left-sided abducens paralysis, bilateral; symptom of Westphal; choked disk; involuntary movements of the head to the left. The urine was constantly normal. A probable diagnosis was made of a tumor of the cerebellum. There was also pulmonary phthisis. At the autopsy a tumor of the fourth ventricle was found, with marked compression of the medulla oblongata.

The second case was in a male of 30. There had been pain in the neck and a swelling in the region of the seventh cervical vertebræ; paresis of the left upper extremity; swelling of the left hand at first, soon after of the right hand. Peculiar gait, becoming distinctly spastic. A probable diagnosis was made of a tumor in the posterior fossa. There was also foot-clonus, cincture sensation, increase of the cutaneous and patellar reflexes, the former disappearing at a later period, whilst the latter remained; complete paralysis of all the extremities; difficulty of deglutition; disturbance of speech; paralysis of the sphincter vesicæ; pneumonia. At the autopsy a tumor was found in the fourth ventricle, compressing the medulla oblongata, together with hydrocephalus. He quotes 2 cases of tumors of the medulla oblongata (Schmidt and Bristowe), which are to be added to the 18 that were collected by Bernhardt in 1881. Most of them were solitary tubercle or gliomata, gliosarcomata, and fibromata, whilst the author's 2 cases were angioma of considerable extent. Although it is possible, as in Schmidt's case, for a tumor of the medulla oblongata to progress without symptoms, the majority have signs which the author divides into two classes, namely, symptoms of pressure which are not pathog-

nomonic of a tumor of the fourth ventricle, and those which are peculiar to this region. Among the first, the most characteristic symptom, which is seldom absent, is the cephalalgia, without a typical location in most cases, sometimes in the frontal, sometimes in the occipital or cervical region. With this is usually conjoined such vague symptoms as vertigo, malaise, choked disk, hydrocephalus, disturbance of the sensorium, convulsions. A general hydrocephalus, such as is generally present in tumors of the fourth ventricle, is also to be included among the general symptoms of pressure. Under certain circumstances, as in one of Joseph's patients, there was a swelling and painfulness in the neighborhood of the vertebral prominences, which he regards as evidence of a lesion in the neighborhood of the fourth ventricle, brought about by venous compression. Among other general symptoms are to be counted the peripheral paralysis, as well as the spasms of the lower extremities, and the cincture feeling, all due to pressure of neighboring structures. Of the symptoms of localized value, the most important are those disturbances of the cranial nerves whose nuclei are in the medulla oblongata. Among these the first implicated are the hypoglossal, the glosso-pharyngeal, the vagus, and the abducens. In Joseph's patients there were lesions of these nerves in varying degree. In neither of the author's patients was there paralysis of the facial, which he regards as important in the differential diagnosis from progressive bulbar paralysis. Auditory disturbances were also lacking in his case, but in neither of his cases was there any diabetes, although in one the pulse was increased and smaller.

Kny⁷⁵ reports a case of isolated tumor of the pineal gland. The patient was 32 years old, admitted to the hospital February, 1883. In the spring of 1881 the first symptoms had been a stabbing pain beneath the external occipital protuberance, which extended over the vertex and the lateral portions of the head to the forehead during the year. From July, 1882, there had been continuous noises in the ears and painful pulsation in the skull. These symptoms were at first constant, but became intermittent, and were accompanied by great dizziness, obscuration of vision, general tremor, and impairment of consciousness for hours. Since the fall of 1882 sight had become so much impaired that the patient was unable to read or to go about alone. Among these

early symptoms were also lancinating pains in the posterior portion of the thighs, seldom in the right arm. In February, 1883, a bilateral choked disk, complete right amaurosis, which was almost complete on the left. From the beginning of August, 1884, there was urinary incontinence. In November, 1884, there was nystagmus, slow speech, and continuous pain in the head, steadily in the occiput. In May, 1885, there was noted slow but continuous diminution of intelligence. In October, 1885, patient could not walk alone, and had to be fed. In November, 1885, he was in a semi-comatose condition; no retraction of the head; slight degree of divergent strabismus, pupils markedly dilated, not reacting to light; slight lateral nystagmus; inability to stand upright; great tendency to fall backward; in walking short steps, but no swinging of the legs; muscular strength retained in all the muscles; no perceptible disturbance in smell, hearing, taste, cutaneous or muscular sense, or patellar reflexes. In the latter months of life the condition was that of increasing dementia, with wide, staring pupils and occasional epileptiform attacks. There was found post-mortem a round-cell sarcoma of the pineal gland, having only slight connection with the velum, and entirely detachable from the underlying corpus quadrigeminus, which latter was somewhat pressed backward by the tumor and flattened anteriorly. The author alludes to 7 cases of tumors implicating the pineal gland alone, and collected by Schulze, and also to 1 case of Daly's. The diagnosis of such a tumor during life is, of course, impossible.

Whitwell¹⁸⁶_{July} reports a tumor of the pituitary body without symptoms of special diagnostic value.

Rendu¹⁵²_{May 11} reports a case of glioma of the medulla oblongata implicating the origins of the facial, auditory, abductor, glossopharyngeal and hypoglossal nerves. Female, of 34, entered the hospital with complete left facial paralysis. The facies on this side was absolutely immobile and expressionless; the labial commissure lowered and pendant; the naso-labial groove effaced; complete paralysis of the orbicularis auris, as well as the palpebral orbicularis. The movements of the eye were intact and the conjunctiva was slightly injected. Paralysis of the superciliary and frontal muscles, the uvula deviated to the right, and the internal peristaphylinus partially paralyzed. The pharyngeal mucous mem-

brane was but slightly sensitive, and the patient complained of loss of taste. There was considerable diminution of faradic excitability in the muscles. There was complete deafness on the left side, even to bone conduction. The facial paralysis had begun a year before with slight loss of power in the palpebral orbicularis, and had progressed very gradually. The deviation of the mouth and the inability to close the lid were perceived before the slightest auditory trouble appeared, and this latter had not been accompanied by any painful symptoms. The internal ear and the tympanum were found healthy. There were no other symptoms than those that have been narrated. As the case progressed there was difficulty of deglutition, lingual paresis, uncertain gait, cephalalgia, vomiting of cerebral type, vertigo, somnolence, persisting internal strabismus of the left eye; paresis of the upper and lower extremities, progressing to such helplessness that the patient was confined to bed; tremor of the head, difficulty of articulation, and death. The cerebrum was normal, excepting some congestion of the meninges. The tumor is represented in the plate, one side implicating the under surface of the pons, implicating the entire thickness of the middle cerebella peduncle, which was double its normal size. The olivary body and a portion of the restiform body were also involved.

East ²_{Oct. 16} reports a case of cerebral glioma from Ferrier's wards in King's College Hospital. A male aged 21 was admitted with left hemiplegia, which had been coming on gradually for three months. About two months before he had had cephalalgia, mainly occipital, with sickness, both of temporary duration. About a week before he had had a convulsion; particulars unknown. There was slight pain on pressure of head, 1 inch (25 millimetres) to the right of the middle line.

The muscles on the left side of the face did not act so strongly as those on the right side, and this side of the face looked somewhat flattened. Ocular movements were normal. Slight deviation of the tongue to the left. The left arm was weak, the hand especially. He could extend the fingers slightly, but could not abduct or adduct them. Dorsal flexion of the right foot stronger than of the left. The right leg was dragged and circumducted in walking. Patellar reflex was present on both sides; the left was more active than the right. No ankle-clonus, anæsthesia, or analgesia.

Tact and muscular sense normal. Hearing normal on both sides. Memory good. Left optic disk and its vessels normal, but right disk very congested, its margins blurred, and its vessels urged forward. After admission patient lost power in his left arm, being quite unable to raise his elbow from the bed, and the index finger seeming to be the only one he could move voluntarily. Some three weeks after admission there was frontal cephalalgia and vomiting, temperature 100.8° to 101° F. (38.22° to 38.33° C.), with sore throat, this headache and sore throat lasting for some four days. Patient began to walk with some difficulty. About a month after admission was quite unable to extend his fingers, and the weakness of the left side of the face became very pronounced. He could barely flex the left foot, but had no power to invert or evert it. Tactile and muscular sense was still normal on the left, and at times a congestion of the left disk was observed. Some seven weeks after admission tactile sensibility became greatly impaired over the whole of the left side, but there was no hemiopia. The retinal troubles had then increased, until there was much congestion on the left and well-marked optic neuritis on the right. About three and a half months after admission hemiopia had gradually developed on the left side, and became complete. About four and a half months after admission there was a convulsion lasting one minute, affecting the right side of the face, with unconsciousness for a half-hour. A few days afterward there was a series of convulsions. One began in the right arm and extended to the right face and leg, lasting one minute. Fifty minutes afterward another convulsed the right face and arm, not affecting the leg, lasting one and a half minutes. Two and a half hours afterward another began in the right arm, then extended to the right leg, lasting one and a half minutes; then four convulsions in the next two and a half hours, details not being given; and, finally, one which affected the arm and face only. There was no rise in temperature during the convulsions, the breathing was very labored, there was foaming at the mouth, constant ocular movements, and occasionally convergent strabismus. There were several more convulsions late on the evening of this same day, and a series upon the next day. During the later convulsions the left arm was drawn up to the shoulder. Post-mortem, the convolutions of the right hemispheres appeared somewhat flattened

and depressed, being hyperæmic on both sides. The corpus callosum was softened and of a pinkish color, especially at the genu and splenium, from gliomatous infiltration. In the medullary substance of the right frontal lobe, anterior to and above the corpus striatum, there was an ill-defined gliomatous mass, surrounded by an area of softening; and the whole medullary substance of the hemisphere had a pinkish tint due to gliomatous infiltration, extending across the corpus callosum into the left hemisphere, which exhibited in the frontal region a mass similar to that on the right side. A similar tint was also, to a slight degree, perceptible throughout the pons. It is interesting to note that Ferrier did not consider the indications such as would justify operative interference. In some remarks upon the case, he states his belief that optic neuritis, in cases of cerebral tumor, commences, as a rule, in the eye on the same side as the disease, as it did in this case.

Hirst¹¹² reports a bilateral cephalo-hæmatoma in a young infant at birth. No treatment was adopted, as the child's health remained good and the swelling became gradually less.

H. C. Coe¹³⁹ reports a case of internal strabismus of the left eye, with slight ptosis, following the use for four days of 5-grain (0.324 gramme) doses of quinine four times a day in a drachm (3.9 grammes) of dilute hydrobromic acid. It appeared that these same symptoms had appeared once before, after the continued administration of 15 grains (0.97 gramme) of quinine daily. The paralysis became more marked for several days after discontinuance of the quinine, and then improved slowly and imperfectly. As this woman had entered a cancer hospital with extensive scirrhous there should be a fair doubt as to how much was due to some intra-cranial extension of the carcinomatous disease.

ABSCESS.

Conchon¹²⁴¹ found two recent abscesses in the right hemisphere of a patient who had entered the hospital very much prostrated with what seemed to be typhoid fever, although this diagnosis was not regarded as certain because of the intensity of the cephalalgia and slight stiffness of the neck, causing suspicion of typhoid meningitis. A hemiplegia ensued, and other symptoms (not mentioned) were present that warranted a further diagnosis of tubercular meningitis. As a sacculated dilatation was found of the bronchial

tubes, with purulent cavities in the inferior pulmonary lobes, the cerebral abscess had evidently been a metastasis from this point. The writer states that he has collected 43 observations of cerebral abscess alone, without attending pulmonary suppuration. Of these, bronchial dilatation was the most frequent starting-point (14 cases); next, chronic pneumonia (10 cases); then, less rarely, acute pneumonia, pulmonary phthisis, purulent pleurisy. He believes that the cerebral suppuration is due to micro-organisms led to the brain by the circulation. Although admitting that the symptoms are very obscure, Conchon states that the following are generally present: Intense cephalalgia, vertigo, numbness, some feebleness on one side. These signs in an individual with the pulmonary affection as above should cause suspicion. After a variable time, sometimes very suddenly, a complete hemiplegia supervenes, or a monoplegia, with or without apoplectiform sensations; or, at other times an epileptiform attack or aphasia, or maniacal delirium. In certain cases death ensues during the coma following the first attack; oftener, however, the convulsive symptoms cease and the paralysis disappear. These remissions, generally of short duration, may last several months; they correspond to the encystment of the cerebral abscess. But, ordinarily, progress is rapid, and the paralysis alternates with contractures and convulsions. The essential feature is the variability of the symptoms. Generally, death is in the coma, with an elevated temperature and a considerable acceleration of the pulse, which remains soft during the evolution of the malady. The acute period scarcely ever extends beyond four to six weeks, and the average is twenty to thirty days.

Von Bergmann⁶⁰ reports a cured case of cerebral abscess in a male of 29, who had suffered for fifteen years from a purulent discharge from the right ear. Although he had usually been but little inconvenienced by the trouble, he had occasionally had sharp aural pains, and on this account sought medical aid. Vertigo had been present occasionally for three weeks, so that he had staggered against passers-by. There was lassitude, especially toward evening; anorexia, frequent chills, and flushes. Several days before, severe cephalalgia had begun, day and night, causing insomnia. The whole head was painful, the right side most so. The patient was apathetic, lay in bed, could scarcely raise his head, and replied to questions slowly and with difficulty. Temperature

39.7° C. (103.4° F.), respiration 24, pulse 50. The left arm could not be held extended long, although the right one could. Slight analgesia of the left arm and leg; slightly weaker grasp of the left hand. During the examination there was twitching of the right facial, succeeded by paresis in its lower branches. Tongue pointed straight; pupils equal and reacting normally; ocular muscles normal. Bleeding granulations filled the lower part of the external meatus. No denuded bone was felt with the probe. Mastoid process was not swollen or tender; deafness of the right ear. Percussion of the skull painful only over the region of the aural muscle. Basing his diagnosis upon the febrile phenomena and the general symptoms, von Bergmann diagnosticated an abscess. The slow pulse and its irritability (alternating from 64 to 60 and 46), in conjunction with the severe cephalalgia, of sudden onset and rapidly increasing, the vertigo, disturbances of equilibrium, the hebitude, the prone attitude, and the inability to raise the head, were regarded by von Bergmann as evidences that the abscess was intra-cranial. As large, voluminous collections of pus do not occur between the dura and the bone, it was believed that the abscess was either in the temporal lobe or the cerebellum. In favor of the former opinion was the great pain upon percussion of the right side of the head and the lack of evidence of pus in the mastoid process. That it was in the right temporal lobe was proven, in the author's opinion, by the paresis and analgesia of the left side. The implication of the right facial nerve was not regarded as of localizing value, as the nerve ran through the suppurating mass. A tangent was drawn to the posterior edge of the aural muscle, and another crossed it at its highest point, and at the point of crossing these two lines a square piece of bone was removed about 3 to 4 centimetres (1.18 to 1.60 inches) in size. The knife was plunged thrice into the wound before the abscess was reached and emptied. It is to be regretted that the observation of the case had extended only over a few days at the time of the report, although the patient was discharged cured,—how long after the operation is not exactly stated. Von Bergmann lays especial stress upon the use of the knife in such cases in preference to aspiration.

Brooks⁶ reports a fatal case of cerebral abscess following a right pleuro-pneumonia, with profuse and offensive expectoration. This was in July, 1885. In May, 1886, the cerebral symptoms

began with severe headache and epileptiform convulsions. As the patient had been subject to epilepsy many years before, it was supposed that this was the trouble. Later on, however, the convulsions became unilateral; there was contracture of the right arm and leg; the speech was slow and thick; there was severe pain over the left parietal region, and a diagnosis was made of a hæmorrhage or embolus involving the convolutions around the fissure of Rolando. A large abscess was found occupying the greater part of the temporo-sphenoidal lobe. It was not encapsulated.

Maus⁶⁹_{Mar. 25} reports a traumatic abscess of the left anterior and parietal lobes, caused by a fragment of an army-rifle metallic shell, which had passed through the cheek, inflicting an injury to the superior coronary artery, and appeared in the buccal cavity opposite the left upper second molar, from which it disappeared into the muscular tissue of the cheek. Fourteen days afterward the cerebral symptoms began and death ensued three weeks later. It was ascertained that the brass rifle-shell, calibre 45, had, after striking the second left upper molar, been deflected and passed back into the cheek, along the temporal muscle into the zygomatic fossa; thence perforating the skin through the great wing of the sphenoid bone, about $1\frac{1}{2}$ centimetres (0.56 inch) behind the sphenoid fissure; entering the anterior margin of the left parietal lobe, passing through the fissure of Sylvius, barely escaping the middle cerebral artery, and burying itself midway in the left frontal lobe, where it caused a large abscess, involving almost the entire lobe.

Heineke³⁴_{Aug. 18} cited a case of so-called cured cerebral abscess. Patient was a stupid individual, who had suffered from childhood with deafness and cloudiness of the cornea. Toward the end of the year 1887, suffered from chronic bronchitis, with scanty expectoration and frequent emesis. In October, 1888, there was pain and emesis, then bilateral ptosis, a paresis of the left arm, left side of the face, left leg, and finally of both legs. Ophthalmoscopically, the retinal vessels were found to be full, and there were some hæmorrhages. Patient then became comatose (the eyes were staring, etc.). A diagnosis was made of cerebral abscess. A small opening was made in the skull, and pus was drawn out with a syringe, when a larger opening was made and an unsuccessful attempt was made to find the abscess. A few days afterward the operation was again undertaken, and successfully, and the patient

improved. In the middle of December, however, she became worse again, and there were several convulsions of the face and the upper extremities. The abscess was again found and emptied, and the improvement is said to have since maintained, the history going to the middle of the following February.

Von Donhoff⁹⁶ reports an operative cure of a case of abscess of the brain, consequent upon the projection of a spiculum of bone, resulting from a comminuted fracture of the squama of the temporal and parietal bones.

Bouisson⁷ reports a case of left hemiplegia caused by an abscess of the right ascending parietal convolution.

Dana¹ reports 2 cases of focal lesion of the temporo-sphenoidal lobe with forced movements. The first was a case of abscess of the right temporal lobe, of traumatic origin, developing slowly in the course of two years, in a woman of 32. The notable symptom, aside from headache and the hysterical mental condition, was sudden forced movements, causing the patient to fall backward and to the right. She was continually falling out of bed on the right side, and would sometimes perform manège movements. Death was sudden. An old circumscribed abscess of the third and fourth right temporal convolution was found, with a recent hæmorrhage into the cavity, and bursting into the lateral ventricle. The second case was a male of 40, who had been brought into the hospital in a condition of delirium. There was a history of an apoplectic stroke the year before, followed by dizziness and twitchings, during which he would fall always to the right. A meningo-encephalitis was found, causing deep and extensive softening of the second and third right temporal convolutions. In the discussion that ensued, Dana admitted that the only defective point in the history was that no thorough examination had been made of the internal ear.

MISCELLANEOUS PARALYSES.

Adamkiewicz⁸⁴ reports a case of progressive one-sided paralysis of the cranial nerves. Patient was a female 54 years old. She complained of severe headache over the right frontal and parietal region, which had been present about five months, having been at first slight, then gradually becoming marked. Latterly insomnia had accompanied it, and also right ptosis. The right upper lid hung flaccidly over upper two-thirds of the eye, and is not under

control of volition. The pupil was more dilated and reacted more sluggishly than its fellow. The eyeball could not be turned outward in the horizontal plane beyond the middle line, nor could it be turned downward or outward; so that the superior oblique and the external rectus muscles were paralyzed, both being supplied by the trochlear nerve. The dilated pupil and its sluggish reaction pointed to disturbances of innervation, especially in the territory of the oculo-motor nerve, through the short root going into the ciliary ganglion and thence to the iris. In other than these particulars the eyes were perfectly normal. The tongue deviated distinctly to the right (paralysis of the right hypoglossal nerve), but there was no atrophy visible. The palate, the vocal cords, the facial and the deglutition muscles were normal, as well as the muscles of the neck and thorax. Sensibility and sense of taste were entirely lost upon the affected side. The anæsthesia was absolute to all stimulants. It extended on the face upward over the line of the hair nearly to the frontal suture, reaching forward sharply to the middle line, dividing the forehead, the nose, the upper lip entirely, and the under lip in its upper half exactly in two. This anæsthesia also implicated the conjunctiva and cornea of the right eye, the left nasal wall, and the mucous membrane of the buccal cavity exactly to the middle line, both of the hard and soft palates, of the tongue, the uvula, the gums, and of the floor of the mouth; the right half of the tongue had lost its sense of taste so that sugar, bicarbonate of soda, vinegar, and quinine were not tasted. Nor was the sense of taste entirely normal in the posterior portion of the right half of the tongue. The lachrymal secretion on the right side could not be affected reflexly through the nasal mucous membrane. If the latter was irritated on the left side, tears appeared only in the left eye. As the lachrymal secretion, as well as that of the saliva and sweat, are bilateral functions, responding bilaterally to a one-sided irritation, the author regarded this weeping only in one eye as evidence of a disturbance in the innervation of the lachrymal secretion of the patient; and in support of this view would seem to be the fact that even in spontaneous weeping tears flowed only from the left eye. From these symptoms there was evidently a total paralysis of the trigeminus,—at least, of all its sensory branches. The paralysis of the first branch (ophthalmic nerve) corresponded to the anæsthesia of the

forehead (frontal nerve), and of the nasal mucous membrane (naso-ciliary nerve), as well as to the interruption in the lachrymal secretion (lachrymal nerve). As the naso-ciliary and lachrymal nerves also supply the bulb with sensory fibres, their paralysis would explain the complete lack of sensation of the ocular bulb. The second branch of the trigeminus lends sensation to the face (infra-orbital nerve), to the cheek (zygomatic nerve), and to the mucous membrane of the upper jaw (spheno-palatine nerve); so that the loss of sensation in these parts was evidently due to lesion of this branch. As the sensory portion of the third branch of the trigeminal nerve sends sensory fibres to the parietal region (auriculo-temporal nerve), to the skin over the lower jaw (mandibular nerve), and to the mucous membrane on the corresponding half of the tongue and mouth, the anæsthesia of these parts would be due to lesion of this branch; but its motor fibres were intact. At a later period the facial nerve became implicated in all its branches. At the autopsy, after the removal of the brain from the dura, a large portion of the dura covering the base of the brain, especially the portion of its right half, was found to be red and injected, and covered with a pseudomembrane, which tore off easily. The dura was strongly adherent in places to the bone, and in other places could not be removed, whilst it was greatly thickened and perforated by polypous growths. The territory of the diseased dura was found to be occupied by a tumor filling the right antrum of Highmore. Microscopically, this tumor was found to be a carcinoma.

Bamberger and Nothnagel have each described a case of this kind. The first author's patient was a female of 53, beginning with severe pains in the right half of the face, and progressing in three years to disease of most of the cranial nerves on the affected side; so that there was complete paralysis of the third pair, the trochlear, abducens, trigeminus, and facial nerves, and partial paralysis of the glosso-pharyngeal, auditory, and accessory nerves, there being no implication of the olfactory, vagus, or hypoglossus. There was no autopsy in this case, and a diagnosis was made of a lesion of the centres of the affected nerve in the floor of the fourth ventricle. Nothnagel's case was that of a young girl, scrofulous from childhood. A one-sided pain in the head and face was the first symptom; then there was discharge from the ear and loss of hearing upon the affected side, and gradually the cranial nerves

on this side were affected so that the patient presented these symptoms: Paralysis of the abducens in the left eye; atrophy and paresis of the left half of the tongue, of the left trapezius and sterno-cleido-mastoid, and of the vocal cord, the palate, and all the muscles of the face on the left side, so that the mimic movements and shutting of the eye on the left side became impossible. There was also a paresis of the left muscles of mastication, paralysis of sensation of the whole affected half of the face and the left eyeball, loss of taste of the left half of the tongue and of hearing in the corresponding ear; double neuroretinitis, a so-called neuro-paralytic inflammation of the conjunctiva; left amblyopia, fever, and rigidity of the neck. A diagnosis was made of chronic inflammation of the cerebral membranes of the base. Kundrat made the autopsy. An abscess was found at the base of the brain extending over the left petrous portion of the temporal bone back over the occipital bone, encapsulated, adherent to the left half of the pons and to the left edge of the medulla oblongata, and proceeding from necrosis of the bones mentioned. The facial, auditory, glosso-pharyngeal, vagus, hypoglossal, and accessory nerves were in the territory of this abscess.

Fürbringer⁶⁹ calls attention to a peculiar disturbance of movement following acute cerebral paralysis in children. The patient was a female 44 years old, who had had some cerebral affection when 6 years old, which had caused a paralysis of the right side and then the peculiar movement about to be described in the paralyzed muscles. These movements are principally in the right upper extremity, less in the right lower extremity, whilst the trunk and head are scarcely at all affected, although the speech is difficult and somewhat indistinct. The movements are described as slow, athetotic movements, especially in the hand and fingers; a continual grasping, spreading, stretching, closing, extension, and overlapping of the fingers, as has been described in other cases. In addition to these there are peculiar jerky, swinging movements that ensue if attempts at passive movements are made upon the patient. These movements are at times so energetic that the patient has involuntarily severely struck people coming too near her. She is hemiparetic, but this is difficult to test, as the aforesaid spasms begin if passive movements are attempted. The gait is that of a pure hemiparetic, with symptoms of club-foot.

No especial muscular atrophy or no vasomotor disturbances. Sensibility and skin reflexes are intact. Tendon reflexes are greatly exaggerated on both sides. Mental functions are good.

Schnell,⁴⁶ reports an interesting case of traumatic amnesia and traumatic paralysis of the oculo-motor nerve. Patient had fallen down stairs. Besides some contusion of the shoulder and slight ecchymosis in the frontal region, there was a complete and typical paralysis of the motor oculi communis, a paresis of the inferior distribution in the facial, a slight trouble of hearing, polyuria, complete amnesia of a period covering several hours previous to the accident. The facial, auditory, and bulbar phenomena disappeared in the course of a few months, and the polyuria greatly diminished in the same time. The ocular lesion improved much more slowly. Four months after the trauma the upper lid could be lifted slightly. Two months after the accident the blepharoptosis disappeared, and there was but a slight strabismus with diplopia. The author believes that the symptoms were due to a traumatic lesion of the third pair, the facial and the auditory. This is a very curious observation, of great medico-legal importance, not only because of the complete and isolated paralysis of the third pair, but also because of the amnesia illustrating the characteristics that have been observed by so many authors. The article will well repay perusal by any one who is interested in medico-legal lore.

Desplats²²⁰ reports a case under the heading of "Acute Bulbar Paralysis;" but as the patient is still living, and the symptoms are by no means certainly indicative of bulbar paralysis, the title of the paper is rather premature.

Fortin²⁰⁸ reports a case of so-called pneumonic paralysis, *i.e.*, a paralysis following pneumonia, in a male of 73, appearing two weeks after pneumonia, implicating the arm, the leg, and face on the same side. There was also a slight degree of aphasia. The hemiplegia lasted eight days. This is certainly an interesting case of rare pneumonic complication, and has the peculiarities that have been observed in the other cases that have been reported.

Pilliet reports the following interesting cases of atypical pneumonia of the cerebrum: A child of 21 months entered the hospital for hydrocephalus. The mother had lost two children from this disease. The head of the patient had commenced to enlarge

toward the sixth month, and the disease made rapid progress, so that the child died two weeks after admission. At the autopsy a considerable dilatation of the ventricles was found, with corresponding thinning of the cortex and the hemispheres, and at the level of the peduncles a tumor the size of half a mandarin. Upon a microscopical examination this tumor was found to be composed of foetal gray matter, with nerve-cells without proliferation, and by vascular tissue invading and modifying this primitive tissue; in other words, it was an embryonic neuroma about to be penetrated by the vessels.

MENINGITIS.

Cerebro-Spinal Meningitis.—Felix Wolff,¹²⁴² speaking of the relation of cerebro-spinal meningitis to infectious diseases, states that in all the latter meningitic phenomena are observed, more frequent in some than in others; and it would appear as if these meningitic phenomena were not due to any special infection other than that of the infectious disease which they accompany, as is illustrated by the potentiality of the micro-organism of pneumonia to cause pulmonary inflammation or meningitis. This consideration leads the author to regard the isolated cases of cerebro-spinal meningitis not as instances of independent infectious disease, but as pneumonia, typhus, etc., with unusual localization, *i.e.*, cases in which the virus is localized in the central organs. Analyzing 132 cases of epidemic cerebro-spinal meningitis that were observed in six years in the Hamburg Hospital, the author found that during the whole six years certain portions of the city steadily furnished cases of meningitis, whilst others were steadily free from the disease. The unfavorable localities were not thickly populated, and had nothing peculiar either in their position or in their hygienic surroundings. It would seem that meningitis was indubitably dependent upon climatic circumstances, especially upon the moisture of the earth and air. The most cases were from February to June, *i.e.*, at the time following the greatest telluric moisture; whilst in July and August very few or no cases were observed, the frequency commencing in September.

Kohlmann⁴ reports some observations demonstrating the contagiousness of cerebro-spinal meningitis. A patient of 61 became suddenly ill with cephalalgia, violent vomiting and convulsions, and great prostration, from which symptoms he recovered in a

few days. In the same house, several weeks later, a son of 18 years became ill with chills, fever, and cephalalgia, to which succeeded great dizziness, nausea, great prostration, and slight stiffness of the neck. In four days improvement began, ending in recovery. About a week later the daughter, 23 years old, became ill with a chill, cephalalgia, anorexia, nausea, and great prostration, to which succeeded dizziness, vomiting, delirium, tonic convulsions of the extensors, and finally death in 48 hours. In another portion of the same city a youth of 14 was attacked with the headache, nausea, great prostration, retraction of the neck, tonic convulsions, and finally death seventy-two hours after the onset. Three days afterward the mother of this youth, 57 years old, became ill with croupous pneumonia. Several days after the onset she complained of severe pains in the upper portions of the vertebral column, of a different nature to the pleuritic ones, which had improved. These vertebral pains were increased very greatly upon pressure, which caused stiffness in the neck, and, on three occasions, tonic rigidity of the upper extremities, alternating with clonic movements. Seven days after the onset death ensued from pulmonary œdema. The author found that the principal cause of the infection in these two families came from a servant-girl who had died after these symptoms: Intense headache, delirium, vomiting, constipation, abdominal reaction, pupillary symptoms, coma, cephalic pulse, contractures. Her father and her brother lent her clothes to some neighbors, and one coat was lent to the first case, whose son and daughter also suffered from the affection; whilst another one was lent to the young boy, whose death was succeeded by that of his mother. A very curious fact is that the infection does not seem to have broken out in these two families until four, five, and five and a half months afterward. A woman of 29 visited the third case, not remaining more than ten minutes, but held during this time the head of the patient during a medical examination. Eight days afterward she complained of dizziness and weariness. Six days later still she became unconscious and convulsed, was confused, had a chill, fever, slight delirium, all which symptoms disappeared in the course of a week, ending in complete recovery.

Bozzolo⁵⁷ suggests the use of bacteriological investigation as an important means in the diagnosis of spinal meningitis. A man

of 54, with fever, chills, icterus, pain in the neck, delirium, emesis, loss of tendon reflexes, enlarged spleen and liver, was used as a subject. On the ninth day of the disease exploratory puncture was made into the liver. Cultures were made with the extracted blood, and inoculation was performed upon mice and rabbits, demonstrating the existence of the diplococcus pneumoniae. A diagnosis was made of cerebro-spinal meningitis. The patient died and the diagnosis was confirmed by an autopsy. Pneumonia had been excluded clinically because of absence of physical signs. Bozzolo emphasizes the importance of this bacteriological observation when the diagnosis is doubtful, and mentions a very simple method suggested by his assistant, Belfanti, which consists in taking a small quantity of blood from a vein, putting it into a thermostat warmed to 37° C. (98.6° F.), and leaving it there for ten or twelve hours. If the diplococcus is present in the blood, numerous colonies of these micro-organisms will be seen upon the surface of the coagulum.

Blanquinque,⁸⁵ reports 4 cases of recovery, but 2 of the cases are not reported in sufficient detail to enable us to exclude diseases that are capable in the child of causing symptoms resembling meningitis, and, moreover, so many remedies were used as to make it impossible to say what was the effect of any one.

Tubercular Meningitis.—Rendu,¹⁰⁰ gives a very interesting and precise account of tuberculous meningitis occurring in an adult, presenting the typical symptoms with its three successive stages: first, the stage of bacillary invasion, with inflammatory and circulatory trouble of the brain; second, the stage of excitation, characterized by the diminution of cortical phenomena and accentuation of the bulbar phenomena; third, the stage of paralytic depression, lasting till the fatal termination.

Jaccoud,¹⁷⁷ reports a case of tuberculous meningitis in an adult, with pulmonary lesions.

Leblond reports a case in which the focus of tuberculous meningitis was limited to the motor convolutions in a case of general tuberculosis.

Rothziegel,⁸ reports a case of hemiplegia, in which the autopsy showed that there was a diffuse tubercular meningitis.

Suppurative Meningitis.—Netter,¹⁵² has an interesting article upon suppurative meningitis. He had collected 25 cases, all of

which were followed by microscopical examination, 14 by cultures and inoculations, and 6 by inoculations without cultures. These cases had all been seen by him in five years, and he had made 17 autopsies, and the others of his 25 cases were communicated to him by others. These 17 cases, seen by one observer, prove the falsity of the general opinion that suppurative meningitis is seldom seen except as a sequel of otitis, a cranial traumatism, or a pneumonia. Four cases complicated a suppurative otitis, 6 a pneumonia, 1 a cerebral tumor, 3 an ulcerative endocarditis, 1 a typhoid fever, and in a certain number it was the only lesion found at the autopsy. The ages varied greatly, none occurring during the second year of infancy, although 5 occurred in children of less than 1 year. The spinal cavity was generally opened, and in the larger number of cases an exudate was found upon the surface of the cord; so that the suppurative meningitis was ordinary cerebro-spinal, and this characteristic is therefore not special to epidemic meningitis. The author distinguishes between a direct suppurative meningitis and one of metastatic origin; in the first, pathogenic agents entering the cranial cavity through the cavities emerging from the pharynx and the nasal fossa, such as the auditory apparatus, the upper wall of the nares, and the bony sinuses. In 6 cases this mechanism was undoubted, the penetration in 4 cases being through the auditory cavities, in 1 case by the sphenoid sinus, and in 1 case by the cribriform plate of the ethmoid. In 3 of these 6 cases a purulent exudate was found in the internal surface of the dura mater and in 2 cases upon its external surface. In 11 cases the meningitis was metastatic, the pathogenic agents having been carried to the brain by the blood. In 1 case they came from the placenta, in another from the pleura, and for the remaining 8 from the lung. In 9 cases it was impossible to ascertain whether the infection was direct or indirect. Six species of micro-organisms were found: In 18 a pneumococcus; in 4 the streptococcus pyogenes; in 2 a microbe resembling the intra-cellular diplococcus of Weichselbaum; once a short bacillus of great mobility, presenting most of the characteristics of the typhoid bacillus; once a microbe very much like the pneumobacillus of Friedländer; and in 1 case certain unknown bacilli that were very delicate and flexible. The author has, furthermore, collected 45 observations of suppurative meningitis with bacteriological examinations, and in 27 of them the

pneumococcus was found, in 6 the streptococcus pyogenes, in 10 the intra-cellular diplococcus, and the typhus bacillus (of Neumann and Schafer) once; so that the results tally with those from the author's own cases. Netter is inclined to attach much importance to this difference in the bacterial origin of meningitis, as he is convinced that the symptoms, the course, and the prognosis are not the same in the different kinds, although he does not believe it possible as yet to offer any clinical differentiation. He states that the exudation in which the pneumococci are found is almost always very viscous and greenish, and that the meningitis frequently coincides with a vegetating ulcerative endocarditis, although it would seem that the affection is relatively a benign one. In the cases in which a streptococcus was found the exudation was less adherent, and of a sero-purulent nature, while in the cases containing the bacillus of Friedländer the exudation was remarkably viscous and thick.

J. J. Clark,² reported a case of acute simple meningitis cured by Broadbent. A robust footman had the following symptoms: Great pain in the head, at first followed by vomiting; also great pain in the arms, back, and legs; firm retraction of the head, spasmodic twitchings of the forehead and eyelids, great restlessness, abdominal retraction, pupils equal and contracted, radial arteries small and full between the pulse-beats, pulse 100, evening temperature 103° F. (39.46° C.) at first, slight opisthotonus, macula cerebral. Patient left the hospital twenty-eight days after entering, perfectly well, excepting a slight weakness of one arm. There was no evidence of tubercle in the lungs or testes, although his mother, he said, had died of consumption. He was treated freely with mercury under the direction of Broadbent.

Lampiasi,⁸ relieved the symptoms caused by a traumatic circumscribed lepto-meningitis by trephining. A man of 45 was injured in the left forehead by a large stone. Unconsciousness followed, then continuous headache, and, two months afterward, aphasia, right hemiplegia, diminution of intelligence, and impaired deglutition. Pulse 50, temperature 37° to 38° F. (98.6° to 100.4° C.). The trephine first removed a large splinter of bone pressing upon the dura mater, but no improvement followed. Two days afterward the dura mater was opened, the subjacent membranes being opaque and tearing, and the arachnoid giving vent to a cloudily serous exudation. Irrigations of sublimate were used, with drain-

age. The aphasia disappeared in five days, and then gradually also the paralysis of the arm and leg. Among other conclusions, the author thinks that this case warrants him in affirming that paralytic symptoms may sometimes be a symptom of recent leptomeningitis, and not always the consequence of a direct lesion of the nerve-centres: to which the very serious objection is to be made that there is no proof in this case that the motor area was not itself the cause of the symptoms.

I have ¹_{May} had a case of what was probably a chronic meningitis of the base, which has improved very greatly under iodide, mercury, and galvanization; and I have also ²⁴²_{Feb.} reported a case of leptomeningitis cerebri presenting typical symptoms of disseminated sclerosis.

Meiring Beck ²⁷²_{Nov. 20, '98} reports a case of meningitis complicating otitis media, successfully trephined.

ENCEPHALITIS.

Friedmann, ⁷⁵_{Aug. 1} discussing the histology and classification of the different forms of acute non-suppurative encephalitis, makes the following division: 1. The most characteristic is the one most nearly related to the traumatic irritative encephalitis, being found both in the spinal cord and in the brain. 2. The most constant micro-anatomical lesion is a thick assemblage of large, active, round or angular epitheloid elements, which appear to be laden with more homogeneous or fat and nervous molecules.

Seeligmüller ⁷⁵_{Mar. 18} reports a chronic progressive polyencephalomyelitis. A female of 23 had suffered for four years from a sensation of weakness and heaviness in all four extremities and in the neck, the onset being after a severe fright. For three years there had also been a paralysis of the right oculo-motor, which persisted. Examination on entrance to the hospital demonstrated the following symptoms: Hand-grasp weak on both sides, especially on the right; elevation of the arms in the shoulder-joint not above 45 degrees, and if they are raised to the horizontal they both sink, especially the right; the flexion of the thigh upon the pelvis as a right angle is barely possible; nevertheless, the patient can walk for several hours; can raise herself for some time upon the toes, although she can only use the hands when the elbows are supported; the deltoid, triceps, the sterno-cleido-mastoid, and the external vasti on both sides

are much atrophied and correspondingly relaxed ; there is greatly reduced response to galvanism and faradism (but no reaction of degeneration) on both sides of the deltoid, the triceps, external vastus, extensor digitorum communis longus and brevis, and extensor hallucis, and the abdominal muscles, but the sterno-cleido-mastoid reacts normally. On the right side there was paralysis of the superior oblique, inferior oblique, the inferior rectus, and the internal rectus, and paresis of the levator palpebræ superioris, whilst on the left the external rectus was paralyzed and the internal rectus was paretic. There was also paresis of some muscles not specified in the nasal region of the face on the left, and the tongue pointed to the right. The patellar reflexes were both exaggerated, the abdominal reflex scarcely demonstrable. In the progress of the case general muscular weakness increased rapidly. The case is still under observation.

Sachs²⁴² reports the case of polyencephalitis superior (nuclea ophthalmoplegia) and poliomyelitis. A man in perfect health, without any specific alcoholic or hereditary taint, is affected with a slowly-developing paresis or paralysis of all the ocular muscles. This condition is scarcely fully established before a weakness of the right leg is noticed by giving way at the knee. This weakness is developed into a most marked paralysis, associated with extreme atrophy. The symptoms remain restricted to the right leg and become retrogressive, and do not affect the opposite leg. The arms remained entirely normal. There were also transitory bladder and rectal symptoms.

DISEASES OF THE CORPORA QUADRIGEMINA.

Nothnagel⁴⁷ writes an extremely interesting article on the diagnosis of diseases of the corpora quadrigemina. Bernhardt, in 1881, collected 11 cases of tumor of these bodies, and Nothnagel has since had 3 cases, the correct diagnosis having been made during life in 2 of the latter. One previously-reported case of the author's and those of Bristowe, Ferrier, and Fischer make 18 cases in all of tumor of the corpora quadrigemina, alone or in conjunction with neighboring parts. In 12 of these 18 cases it is expressly stated that there was reeling gait, patients walking unsteadily, hesitatingly, as if intoxicated, or not able to walk without assistance. When a strict analysis, the author claims, is made of the 6 cases in

which ataxy is said to have been absent, it is found that the history is either too defective to warrant such a conclusion or that an examination of the gait was not made or could not be made, or that the corpora quadrigemina were not directly implicated. In Gower's case, in which there was said to have been no ataxy, there was only a partial destruction of one of the corpora quadrigemina; so that the only conclusion that is justifiable is that a solitary lesion of the anterior pair (nates), without injury to the hinder pair, is not sufficient to produce disturbance of co-ordination. The writer believes that it is the direct implication of the corpora quadrigemina which produces the disturbance of co-ordination, as in one of his cases there was a hard tumor of the size of a hazel-nut implicating only the quadrigeminal bodies, and leaving the cerebellum and fourth ventricle wholly intact. He rejects the theory advanced by Bernhardt that the symptoms may originate from hydrocephalus, as hydrocephalus must attain a considerable size for this purpose, which it can only do at advanced periods of the disease; whereas, in many tumor cases, defect of co-ordination in walking was the first perceptible symptom. This peculiar ataxy may occur, of course, in diseases of the vermiform process of the pons or the corpus callosum, in some cases after a large tumor of the cerebral hemispheres, and therefore the author would only attach a diagnostic meaning to it when it appears as the first symptom. Then, as a rule, he states that the point for decision will be as to whether the lesion occupies the vermiform process or the corpora quadrigemina. The latter diagnosis may be made upon the appearance of paralysis and paresis in the territory of the ocular nerves, especially of the oculo-motor. These ocular-nerve troubles are to be ascribed, he thinks, to implication of the nuclei and radical fibres of these nerves. This form of ophthalmoplegia is usually unequal in the degree of the paralysis, especially in the early periods, and in the extent of its distribution. Usually, only some parts of the oculo-motor nuclei are affected, most commonly those relating to the superior and inferior recti; occasionally the lateral movements of the eye are quite abolished, or ptosis may be the first and most marked symptom. It may even happen that the eye is almost completely motionless, as in primary atrophic nuclear paralysis of the ocular nerves, although the writer remarks that he has never, in the ophthalmoplegia accompanying tumor of the quadrigeminal

bodies, observed such nuclear immobility of the eyes as occurs in the former affection. Theoretically it is possible, but it would seem that death takes place before its complete development. Nystagmus, without paralysis of the ocular muscles, has been sometimes observed. It seems to be undecided as to whether an isolated palsy of the trochlear nerve or abducens, together with the defective gait, can claim a diagnostic value. Clinical experience does not support the old view that the corpora quadrigemina are especially related to the visual sense. Some cases were free from visual disturbances, or, if such were present, there were complications, as of optic neuritis with atrophy, which would be sufficient cause. The statement can, therefore, be made, without fear of contradiction, that vision or visual acuity may be unimpaired, although the corpora quadrigemina be wholly destroyed. The reaction of the pupils was so various that no rule could be decided. Motor, sensory, or vasomotor disturbances had not occurred as direct results in disease of the corpora quadrigemina, and have been always observed in cases of implication of the other parts of the brain or hydrocephalus, which so often accompanies tumor of these bodies, frequently with enormous expansion of the normal ventricle and heightened intra-cranial pressure.

CEREBRAL SYPHILIS.

W. R. Gowers,⁶ has given some interesting lectures on syphilis of the nervous system. It may be said, briefly, that they constitute a fair epitome of our present knowledge of the subject, with the exception that some recent original articles are not made mention of.

Négrié¹⁸⁸_{Dec. 22, '90} reports an interesting case of congenital syphilitic hydrocephalus in which the cranial bones were thickened, as in congenital syphilis, and not thinned, as in ordinary hydrocephalus.

Régnier,⁹²_{June 10 Aug.} has a carefully analytical article upon the relationship between cerebral syphilis and general paresis. The conclusions of the author are as follow: Syphilis cannot be considered as a direct cause, either predisposing or occasional, of progressive general paralysis; the same occasional causes produce general paresis in non-syphilitic subjects, whilst they induce specific manifestations in those who have had venereal disease, and it is a specificity which creates a difference between the two

maladies; the anatomical lesions are different, and when found in the same individual they are independent, and the one kind should not be considered as the consequence of the other; the two diseases have a different course in the greater number of cases, the dominant and essential characteristics, from a prognostic view, being the incurability of the one and the curability of the other. These communications of Régnier are a great contribution to our knowledge of these subjects, and should be carefully read by every neurologist.

Angel Money² showed a specimen of atrophy and sclerosis of the left hemisphere without disease of the arteries or membranes, but yet of syphilitic origin. The child had died in convulsions at the age of 16 months. The brain weighed 4 ounces (124.4 grammes). The head was 15 inches (0.381 metre) in circumference and 10 inches (0.254 metre) over the vault. The child was never able to stand or talk. The limbs were spastic, but the left arm least so.

EPILEPSY.

Pathology.—Hughlings Jackson and Beevor² read the notes of a rare case of epilepsy, associated with a tumor in the temporo-sphenoidal lobe, as follow: Female, aged 53, under observation for six days; onset of convulsion thirteen months before, beginning by tremor in hands and arms, when she had a vision of a little black woman busily engaged in cooking, also a very horrible smell and a feeling of suffocation; after all which she stood with her eyes fixed for a short time, without unconsciousness, though there was involuntary micturition. On admission, there was paresis of the right arm and leg, subsequently increasing to paralysis, and double optic neuritis very shortly before death. Only slight headache, no defect of sight, and no other symptom of importance. Authors insisted upon the fact that there was no loss of smell, but only a disordered subjective sensation; and regarded this as an important element in diagnosis, as crude sensations were usually referred to smell or taste, were due to a peculiar sensation in the epigastrium, or were only feelings of reminiscence. They, furthermore, asserted that this was the only case in which this variety of epilepsy had been proved, post-mortem, to be associated with actual lesion in the temporo-sphenoidal region. The whole of the anterior end of the temporo-sphenoidal lobe was occupied by a tumor enveloping

the amygdaloid, but not affecting the gray cortex hippocampal convolution. The nucleus dentatus and the fibres of the internal capsule were much compressed. The lesion lay just outside the descending cornua. It was a small round-cell sarcoma.

Péan¹⁰⁰_{Feb. 21} relates a case of epilepsy, passing into a status epilepticus after four years' duration, the attacks having occurred about every ten days. A paresis of the right leg led to the diagnosis of a tumor occupying the superior part of the pre-central and post-central convolutions. The lower end of the fissure of Rolando was determined upon the skull, and in the posterior part of the operative field a soft tumor was gradually removed, with slight injury to the cerebral substance. The epileptic attacks had ceased two and a half months after the operation.

Chaslin⁴¹_{Mar. 19}, ²¹³_{May} exhibited four brains of epileptics, all showing more or less extensive sclerosis, though one showed no alteration visible to the naked eye except induration of one of the olivary bodies. Microscopically, the convolutions were seen to be small, wrinkled, smooth, or slightly ruffled and atrophied. The hippocampi and olivary bodies were more or less involved. Between these were large patches of apparently healthy tissue. The pia mater was healthy and not adherent. Microscopically, the gray matter of the most markedly altered patches was destroyed by fibrous growth supervening from scattered spindle-cells with hypertrophied process, which cells, under normal conditions, do not form distinct fibrils, while their processes are scarcely visible. Chaslin regards these fibres as neuroglia elements springing from the ectoderm, and believes that this origin accounts for their independence of the other tissues, for the inflamed condition of the vessels, the non-adherence of the membranes, and the special hystero-chemical reactions. He concludes that sclerosis of the brain, at least its most evident forms, is due to proliferation of the neuroglia, and would call it sclerosis neuroglia; and also that so-called true epilepsy is often due to neuroglia proliferation, probably occurring from some developmental disturbance, which is aided by heredity, and not of inflammatory causation.

Frazer²¹³_{Feb.} showed an interesting specimen of atrophy of right cerebral hemisphere in a case of epilepsy, where death followed a severe attack of status epilepticus.

Binswanger⁶⁰_{July 11} has experimentally determined that the me-

chanical and electrical irritation of the medulla oblongata on the attacked side produces only tetanic spasms of the same side, and not tonic and clonic spasms, as in the rabbit.

Rosenbach⁷⁵ discusses at some length the epileptogenic qualities of the posterior region of the cortex. The article is simply a review, with comments on the clinical observations and physiological experiments that have been made upon this subject.

Féré⁷³ reports that a calorimetric examination and an enumeration of the globules of the blood of epileptics had shown that the number of red globules increases, while that of oxyhæmoglobin diminishes with an attack of epilepsy, and that these red globules assume, examined in serum immediately after paroxysm, a spherical form, while at the same time their diameter diminishes.

Pick¹¹³ presented a patient, age 61, of neuropathic heredity, who had received a sabre wound at the point of exit of the left frontal nerve, and several weeks after cicatrization of the wound began to be very irritable, and to have occasional attacks of *petit mal*, generally preceded by an aura from the cicatrix, combined with a roar in the right deaf ear and vertigo. After the attack the patient was confused, in dread, and aggressive, and was twice placed in an insane asylum. The attacks came irregularly, the longest interval being three months. In these attacks he frequently mistook the persons surrounding him for others whom he had known, and there was always diminution of visual acuity and limitation of the field of vision, occasionally diminution of olfactory, gustatory, and cutaneous sensibility, and a few times motility was affected. The cicatrix was excised, and for nine months the patient has only had two slight attacks, the last having occurred six months after excision, and the mental depression has entirely disappeared.

Salzer⁸ narrates a case of epilepsy following a wound on the left side of the head. The symptoms were paresis of the right upper extremity, motor aphasia, drawing and formication in the right extremities and right side of the face, and twisting of the body to the right; these phenomena being followed, after short duration, by unconsciousness. On the seventh day after the trauma, there was a large discharge of pus from the wound, and the symptoms disappeared for three years and nine months, although the patient would occasionally have some slight symptoms in the same distribution. Four years afterward the attack returned, lasting for a

week, occurring every second day, and then disappeared again for forty days, when they again returned, accompanied by an aura. Examination showed a scar over the right parietal bone 5 centimetres (2 inches) long and $1\frac{1}{2}$ centimetres (0.6 inch) wide, in which was experienced a feeling of heaviness and sticking a short time before attack. The bone was trephined at this point, found to be defective and adherent to the dura. Eight days after the operation there was another attack, then an interval of twenty-nine days, and again attacks with irregular intervals, lately convulsions occurring two to three times a day. The author illustrates by this case the necessity of considering the possibility of the existence of a cortical lesion in such cases.

In the discussion following, Billroth stated that he regarded trephining in traumatic epilepsy as of doubtful value, and gave as his reasons that often a trauma is received, following which there are certain symptoms, when the patient becomes healthy, remains so perhaps for three years, when suddenly attacks again appear, from which he argues that something has transpired in the cicatrix which is evidenced at a later period, as in Salzer's case, perhaps a cyst forming from a hæmatoma.

Minot, taking part in the same discussion, pointed out that the uncertainty of success after such operations was often due to two causes: First, it is very difficult to determine the direction in which the force of a trauma will travel through the cerebral contents; so that an occipital trauma does not necessarily mean lesion of the occipital intra-cranial contents. Secondly, a lesion of the cortex may, it is true, cause one-sided convulsions, but the extension of the convulsion to the other side does not necessarily denote an extension of the lesion to this other side, but rather an irradiation of nervous impulses; and that this irradiation more probably travels from subcortical centres, not through the corpus callosum, is proven by Unverricht's section of the latter without arrest of the symptoms; so that in such cases it is doubtful as to what effect an operation on the cortex or skull may have.

Billroth added that he regarded improvement for a year in such cases as warrant for an operation. He, furthermore, suggests that when convulsions of contra-lateral muscles follow in any given case, excision of the centres of these muscles would be beneficial, although the epilepsy might not be cured.

Kohn¹⁰⁹_{Dec., '90} narrates 2 successfully treated cases of reflex epilepsy. One was of a boy, aged 10, who had had for six days a daily attack, in whom there was a cancerous tumor of the left lachrymal sac, of traumatic causation, dating several days previous. This was removed, and two months afterward the child had not had another convulsion. The second case was that of an 8-year-old girl who had had once or twice weekly epileptiform attacks for three months. It was accidentally noticed that there was a yellowish-brown weeping crust, the size of a dollar, about the middle of the upper edge of the occipital bone. This was removed, and beneath it was found a bean-sized loss of substance, wet, with a bad-smelling discharge. Beneath this was found a caries, which had probably been caused some five months before by the pecking of a large chicken. The carious fragment of bone being removed, the fits ceased and did not return for several months later.

Symptomatology.—Hare¹¹²_{Sept.} has analyzed 970 cases of epilepsy from the English and American journals to ascertain the frequency of certain premonitory and after-symptoms in epilepsy. In only 158 was anything said concerning the side most affected by the fit, and in these 158 the right side was most affected in 77 cases, and the left in 81. In 362 cases an aura is stated to have been present, and to have been absent in 138. The forms of aura most commonly felt were as follow:—

Tingling,	45	Gastric,	15
Visual,	27	Cramps in muscles,	11
Painful,	26	Olfactory,	11
Twitching,	21	Mental,	8
Epigastric,	20	Chilliness,	7
Headache,	16	Faintness,	3
Auditory,	16	Abdominal,	3
Dizziness,	15	Aphasia,	3
Numbness,	15	Unclassified,	44
Disturbed respiration,	14		

Coma is noted as present in 104 cases, absent in 12, but the author considers this number to be incorrect, since unconsciousness is a much more common after-symptom. It would appear, however, that the coma in these instances surpassed in its severity the mental hebetude so often seen. In 101 cases only is any statement made as to rotation of the body, in which 49 rotated to the right and 50 to the left.

Hay²⁴² analyzed 34 epileptic patients at Norristown Insane Asylum in order to determine the relative frequency of the aura. The mental condition of all these is said to have been such that their statements were reliable. Twenty were males and 13 females. In 16, or 48.5 per cent., there was no distinct aura of any kind. In 18 various sensations were described, as follow: Gastric aura, going rapidly to the head, 5; general bodily sensation, 3; head aura, consisting of a sharp pain in one, vertigo in another, loud noise in one ear in a third, 3; "distress," and a sense of constriction in the thorax and ascending to the head, 2; in only one case did the aura start in an extremity, beginning with numbness and tingling in both feet, sometimes one, ascending to the knees, increasing in intensity until unconsciousness supervened. The remaining 3 of these 17 patients exhibited more complex sensations. One has optic hallucinations of various animals. Another has an optic hallucination and sudden numbness and tingling in the hands and feet, with vertigo; then amblyopia, followed by a play of colors quickly arranging themselves into a picture of an old man, clad in flowing garments, with long white hair, walking along the sea-shore, and behind him is a boat with men in it, the shore of bright scarlet, with a show of all natural colors. The third has a complex aura involving the ordinary sensations of sight and hearing so that she sees angels surrounded by dazzling light, hears voices singing, has a buzzing in her ears and a pain through the head, during all of which she automatically repeats a certain sacred verse, always the same one. Another patient always imagines himself in some familiar place other than where he really is, sometimes at his boyhood's home, sometimes in an adjoining apartment. At other times he sees a brilliant play of colors, commencing with bright bands which whirl, and at times he sees a mouse running before him over the floor, and he loses consciousness when the animal reaches him.

Charcot⁸⁰ narrates the case of a patient employed on deliveries in a Paris foundry, who, on January 18th, disappeared, leaving the driver to go back to the store alone. Until January 26th he lost all consciousness of his actions, when, at 2 P.M., he awoke standing on a bridge in an unknown town, listening to the brass band of a passing regiment. The interval was a perfect blank to him. He found he was at Brest, some 365 miles from Paris. Counting his money, he found he had 700 francs left out of 900

he had collected. Fearing a return of unconsciousness he put himself in the hands of a *gendarme*, who, with the average stupidity of a policeman, promptly locked him up, although he had a certificate signed by Charcot; and it was only after six days that he regained his freedom. Patient had been previously treated for epilepsy.

Savage²⁷ describes an interesting case of a true epileptic, who had very well marked periods of automatism, in some of which he scattered money; in others he performed highly complicated acts unconsciously.

Meyer²⁸⁵ showed a curious case, with the following history: A female child of 2½ years had been subject for twelve months to numerous epileptiform fits. She was the fifth child of the mother of six children, five of whom were born naturally and at full term. When the mother was four months pregnant, a dog bit her in the fleshy part of the outer posterior surface of the left forearm, a little below the elbow, whereupon she had a fit, the first of her life, which did not return during pregnancy. When the child was born, at full term, a reddish spot was noticed on the baby's left forearm, at a site exactly corresponding to the trauma of the mother. When this child was 11 months old there were some slight twitchings of the limbs, and seven months afterward there was what seems to have been an epileptiform convulsion. It was said that the child growled like a little dog, barked like a dog when she heard one barking; cannot speak, although the other children spoke at 10 months old; cannot walk a few steps without becoming giddy; fondles and runs after dogs; has no fear of the most savage ones. When the child was first observed by the writer, a young dog was lying before the fire, and the child went on her hands and knees to the animal, threw herself beside it, and rested her head on its neck. When the animal yelped the child responded with a bark. Two of these attacks were seen. The mark on the forearm is plainly visible.

Russell²¹³ gives the following curious illustration of hereditary epilepsy in the male line: In a family of three boys and three girls one boy had his first convulsion, without appreciable cause, when 10 months old, a second boy when 4 months old, dying eight days afterward. The father is a somnambulist. A paternal uncle, who is said not to have had any fits himself, has two children, both

boys, one of whom had a fit when eight days old. One maternal uncle had what was, probably, nocturnal epilepsy, and another has had several convulsions. When one of the children had his first convulsion, a maternal uncle and a paternal uncle were present, and both had a fit shortly afterward. All the females have escaped, although there were five paternal aunts, and one of the female children was a twin with the child that died.

Bourneville and Courbarien,⁷³ contribute some valuable statistic notes of the part played by consanguinity in the etiology of epilepsy, hysteria, idiocy, and imbecility, and give the following table:—

DISEASES.			CONSANGUINITY.	
	Males.	Females.	Males.	Females.
Idiopathic epilepsy	272	205	11	6
Symptomatic epilepsy	81	7	1	6
Tardy epilepsy	4	7	1	6
Procurive epilepsy	1	7	1	6
Hemiplegic epilepsy	37	11	1	6
Hydrocephalus	11	11	1	6
Idiocy and imbecility	196	56	6	1
Symptomatic idiots and imbeciles	44	5	5	1
Nervousness	1	5	5	1
Meningitis	1	1	1	1
Chorea	1	1	1	1
Hysteria and hystero-epilepsy	12	21	1	3
Insanity of childhood, mania, and maniacal excitement, delirium of persecution, etc	7	2	1	3
	618	339	36	47

Grand total, 957 males and females. Consanguinity, 88 males and females.

Roller⁷⁵ Aug. 18 relates a case of partial epilepsy in a patient of neurotic heredity who is said to have had her first convulsion in her 53d year, to which succeeded a certain mental weakness and forgetfulness in the 56th year, at which later time the patient was first accurately observed by the writer. Following the attack there was a certain impairment of consciousness, no paralytic symptoms; pupils normal, except that one was somewhat smaller; slight amnesiac aphasia, great depression of spirits, patient anxious, inclined to weep, feared impending death. In the course of the succeeding month the excitement increased to great restlessness, and patient was placed in an institution. There was confusion about circumstances and persons, thought an attendant was an old friend, etc.

The amnesia increased so that the patient could not remember proper words to express herself, and frequently used the wrong words, thus saying "Give me something to drink," although she wanted her pocket-book. A short period of freedom from convulsions followed, but they soon re-appeared, with these symptoms: Loss of consciousness; head drawn to the right and somewhat backward, boring into the pillow; eyeballs directed to the right and somewhat upward; right half of face strongly convulsed, lids of the right eye opening and closing; tonic contractions in the right extremities, then jerking movements in the right arm; the right hand and fingers somewhat flexed, the thumb not closed; later on, jerkings in the right leg, so strong as to shake the bed; the convulsive movements in the right half of the face and neck were so strong that the right side of the neck was swollen after they had ceased; unconsciousness remained for some time after cessation of convulsions, gradually returning. Such attacks recurred at intervals of about four weeks, and after them there was generally a superficial conjunctivitis in the right eye, with slight muco-purulent secretion and slight injection, all these gradually disappearing before the next attack. After the first attacks the patient could not use the right arm for some eight days, a scarcely noticeable uncertainty remaining, although this did not prevent using a saucer and eating with this hand. The use of the right leg returned in two to three days. Right arm and hand could then be used energetically, probably due to sensations which apparently proceeded from the right hand. Patient was sometimes found moving the right hand vigorously in a state of great agitation and dread, making, for instance, movements with the hand as if she would give something, once saying, "Oh, these fingers! where do they come from? they are all falling out." This occurred between the attacks, not immediately before or after them. Further evidences of terrifying hallucinations,—at times an inability to put out the tongue, patient thinking that it had been put out. Toward last convulsions were without loss of consciousness; speech became unintelligible, apparently from convulsive movements of the mouth. One later attack lasted one hour and a half without unconsciousness, another three hours. Still later, attacks ceased almost entirely; patient became apathetic and stupid. At the autopsy the appearances were found as follow:—

Flat but distinct hyperostoses on the inner surface of the frontal and parietal bone.

Dura mater attached to the bone.

Bean-sized pacillonian granulations on the right side, perforating the dura mater above the orbita; on the left a small, bony ring.

The pia mater markedly *sulgid getrubt* over the convexity back of the occipital lobe, the veins being strongly developed.

Pia mater was not adherent.

The cortex was dark-violet colored on section.

Cerebrum was very soft and moist.

In the dorsal portion of the third left frontal convolution there was a bean-sized cyst with discolored wall in the white matter adjoining the cortex; above this lay a soft sclerotic focus of the size of a cherry.

The pia over the left island of Reil was markedly opaque and thickened.

In the white matter of the insula was a dark-colored focus, about 2 centimetres (1 inch) in length.

In the hinder portion of the right optic thalamus, and in the left optic thalamus, a discolored focus, both very small.

Pons œdematous.

Medulla oblongata markedly harder than normal.

In spinal pia numerous small, tough, white bodies on the right side, membrane at this point being very vascular.

Cerebral arteries very atheromatous, especially in the left middle cerebral.

Lloyd, of Philadelphia,²⁴² gives the further history of a case of epilepsy reported in the ANNUAL, vol. iii, A-68, 1889, when only three months after the operation had elapsed. From the fourth to the ninth month, however, there had been ten seizures.

Althaus,²_{Sept. 28} reports a case of epilepsy after vaccination, and Greenwood²_{Oct. 28} takes issue with him in regard to his facts. A lad of 19 has a fit one month after vaccination, which have since recurred about once a month, at one time fourteen in a single night. Althaus states that the patient had not the slightest trace of neurotic heredity, that his habits were steady, that he had begun his duties as a post-office employé shortly after his vaccination, and that the fits commenced one month after this vaccination. Greenwood has inquired into the history, and finds that the boy's father

was consumptive; two sisters died of phthisis; mother has had two miscarriages and three children born dead; the patient was one of fifteen children, five of whom are dead; the younger children are of a highly nervous temperament; patient had had measles, whooping-cough, ulcerated sore throat, winter-cough; has been intemperate; was at his duties before, during, and after vaccination, and the fits began three months after vaccination. It would thus appear that the epilepsy occurred in a very unhealthy individual of a decidedly suspicious heredity, and one who would, therefore, seem to be predisposed to neurosis. All the same, however, the vaccination would seem to have been the exciting cause.

Féré, ⁴⁵² continuing his previous observations upon muscular weakness and tremor, gives several illustrations to show the strength and the degree of tremor in the hands of epileptics at varying periods of the attack. Several illustrations are also given of the muscular movements in epileptics with hemiplegia and hemichorea, taken with a myographic tambour applied to the muscles of the upper extremities, and particularly to the biceps. The twenty illustrations demonstrate that there is a marked exaggeration of movements even three hours after an attack. The next illustration is of the exaggerated movements in the biceps ten minutes after a shock to the tendon of the triceps, and the author suggests that use might be made of this method to detect latent spasmodic tendencies, and especially latent contracture. Efforts, even though they be not violent, made with the limbs of the opposite side, can produce the same result as in a case cited, which could, by a slight effort of the right hand, produce a tremor upon the left hemiplegic side, to be soon followed by an epileptic attack, with unconsciousness, if the effort were continued. Even a sensory irritation may act similarly, and a patient of Bravais is cited who was attacked with a hemiplegic epilepsy after a visual excitation. The author states that it is not rare for an attack to be caused by an ophthalmoscopic examination, and a myographic curve is given of a hemichoreic in the normal state and under the influence of an ordinary excitation produced by the vibration of a diapason, and in this patient, as in those who have been mentioned, an epileptic paroxysm can be produced by prolongation of the excitation. These hemichoreic movements, spontaneous or provoked, are not exclusively

limited to the extremities, but generally extend to the thorax, and there manifest themselves by jerky respiration.

Féré²⁴¹ completes his investigations of the modifications of arterial pressure in epileptic paroxysms. During the aura there is generally an augmentation of arterial pressure of 200 to 300 grammes (6 ounces 4 drachms to 9 ounces 6 drachms), which is maintained during the convulsive period, after which it falls below the normal, and so remains for several hours, 8 to 10, or occasionally even a day after a single attack. After a series of attacks, however, especially if these attacks are not separated by returns to consciousness, this depression may be of 300 or 400 grammes (9 ounces 6 drachms or 13 ounces), and may not disappear for several days. The vertiginous paroxysms are accompanied by similar modifications, generally less pronounced and durable. This is also true of the convulsive periods. If the attacks of mental excitation with agitation do not appear during the depressed period following the convulsive or vertiginous attacks, there is an increase of tension which may amount to 200 or 300 grammes (6 ounces 4 drachms or 9 ounces 6 drachms), falling below the normal upon cessation of the agitation. The increase of pressure during the periods of excitation may be artificially modified by Junod's boot or a mustard-bath. By the former the pressure was lowered from 1050 to 850, being momentarily accompanied by a cessation of the loquacity and agitation; but five minutes after the removal of the apparatus the pressure had mounted again to 950, and the agitation had returned. By the latter method the tension was reduced in one case from 950 to 750, and remained at this figure about three-fourths of an hour, during which time the agitation was less. One patient, whose agitation ordinarily terminated in a convulsion, had this agitation momentarily suspended but also prolonged by the repetition of the bath, and the convulsion did not occur. Two patients had their convulsions suspended during a series of attacks,—one by Junod's boot, the other by the mustard-bath, each method causing depression of the arterial tension. At periods when there was no abnormal elevation of the tension both methods never caused depression of more than 10 grammes ($2\frac{1}{2}$ drachms); in one of these cases, the respiration having been too rapid, there were numerous lenticular ecchymoses beneath the skin, and probably also in the muscles, and the tendon reflexes were exaggerated,

and these phenomena so remained for three days. From these observations it would appear that increase of arterial tension is one of the physiological conditions of epileptic paroxysms of all forms, and we may thus explain the manner in which violent efforts and lively motions play so important a rôle in this malady; and in several of these conditions an increase of pressure was observed to the extent that was described. But these modifications of arterial pressure are not confined to epileptics. In an angry, non-epileptic imbecile it ascended to 1100 grammes (35 ounces 6 drachms); and in a coachman, after a quarrel, it also mounted to 1100 grammes (35 ounces 6 drachms), having been only 800 grammes (25 ounces 6 drachms) an hour before. The author calls attention to the medico-legal value of these facts.

Lemoine, of Lille,⁵⁵ Aug. 14 treats at some length of the epilepsy consecutive to infectious diseases, and arrives at the conclusion that in such cases convulsive attacks are in close relation to the uræmic accessions and closely resemble the cortical phenomena of expulsion of toxic matters contained in the blood, and are therefore very probably due to an accumulation in the blood of extractive matters formed in large quantities in a patient whose nutrition has become perverted.

Féré,⁵ Aug. 22 observing the frequency of phthisis in epileptics, measured the circumference of the thorax in a large number of epileptics, and ascertained that, comparatively to their height, all presented a normal development of the thorax, but the respiratory capacity of the lungs was notably more feeble than in healthy subjects of the same height. This diminution of the respiratory capacity is more marked at the end of an attack, and seems to be due to a paretic condition of the thoracic muscles, and the author is inclined to believe that to this feebleness of respiration is to be attributed the frequency of tuberculosis in epileptics. In the discussion following, Brown-Séquard stated that the bromide of potash was frequently administered, and was, perchance, a factor in the development of phthisis so often seen in this class of patients, especially in the female; at all events, the authors upon this subject in the days preceding the knowledge of the bromides do not appear to have remarked that phthisis was more frequent in epileptics than in others, at the same time that other factors were probably at play. Féré added, in support of Brown-Séquard's opinion, that pulmonary

congestions were frequently among the accidents due to the bromides. Hénocque added that many epileptics, the non-tuberculous ones as well, have the Hippocratic nail, due probably to a general diminution in the activity of molecular changes, of which the tuberculosis might be another expression. Féré had not seen this Hippocratic nail, although he had carefully examined a certain number of epileptics for it. Brown-Séquard rejoined that the Hippocratic nail was, he believed, of reflex origin from pulmonary change, and Capitan stated that the Irish authors had noticed the frequency of this Hippocratic nail in patients with hydatid cysts of the lung.

Eloy⁸⁵ discusses at some length the pleural pseudo-epilepsies and their therapeutic indications, and reviews the literature of the subject.

Treatment.—Doyon²¹¹ analyzed the brain and liver of a boy of 12, who had had a series of epileptic attacks with acute mania for a year, and had taken during this time from 60 to 120 grains (3.90 to 7.80 grammes) daily of potassium bromide. Thirty grains (2 grammes) of bromide were found in the brain, and 12 grains (78 centigrammes) in the liver. As the relative weights of the brain and liver were as 15 to 8, there should have been $22\frac{1}{2}$ grains (1.45 grammes) of bromide in the brain, and hence Doyon concludes that the bromide accumulates more in the brain than in the liver.

Jamot¹⁰⁰ narrates a case of epilepsy which he alleges to have been cured by the bromides; that is, the patient has had no attacks for twenty years. He was 20 years old when first seen; had had no convulsions in infancy; was of excellent health. At 11 he received a violent blow upon the head. Seventeen days afterward he had his first convulsion, which then became very severe, so that when he first came under the author's care he had not left his bed for seven months. He was given 4 grammes (1 drachm) of bromide of potash daily. There was rapid improvement, and during the ensuing six months the attacks of *grand mal* ceased, but the *petit mal* and occasional vertigo persisted, when the dose was raised to 6 grammes ($1\frac{1}{2}$ drachms) daily, causing disappearance of the vertigo. Six months further on the medicine was stopped, without consulting the writer. A month afterward there was a slight convulsion, whereupon the bromide was again administered, and for

twenty years the patient has had nothing more than occasional vertigo. The author, however, does not state whether the bromide was continued during the whole of this period.

Gouber¹⁰⁶ recommends the bromide of gold in the treatment of epilepsy, as it is efficacious, employed in doses of 8 milligrammes ($\frac{1}{8}$ grain) in twenty-four hours, or even 3 to 6 milligrammes ($\frac{1}{16}$ to $\frac{1}{8}$ grain), in an infant, and these doses did not produce either acute or chronic bromism, any cutaneous phenomena, or loss of memory or depression, or the inconvenience of the bromide treatment. But the dose should not be forced beyond the quantities mentioned, or it will produce a persistent slight headache, without somnolence.

Bourneville⁷⁸ gives the histories of 18 patients treated with bromide of nickel, as recommended by Da Costa, stating, as a conclusion, that the remedy has cured only 1 case, the attacks having disappeared for three years; in another there was an amelioration of the symptoms, in a third the disease was unaffected, and in 15 the malady was aggravated.

Diller⁸⁰ treated 9 cases of epilepsy with antifebrin, and claims that when the drug was given continuously there was a reduction in the number of fits, ranging from 25 to 75 per cent., as compared with other months in which the patients were on bromide and tonic treatments alternately; that the remedy was well borne; that no skin eruption was produced; that in any case in which a great number of fits occur, and where it is desirable to control them as soon as possible, the bromides would be of far more value than antifebrin.

Lemoine²⁷⁶ advocates the use of antipyrin in epileptics whose attacks are influenced by menstruation, in those who have masked epilepsy, and in those who are also subject to migraine. A daily dose of 2 grammes (31 grains) ordinarily suffices. There seems to be no advantage in continuing the treatment uninterruptedly, as the patient becomes habituated to the drug, and it is therefore best to give it only during the periods mentioned. Crocq, in the discussion following the paper, also indorsed this use of antipyrin in epilepsy associated with menstruation.

Starr⁵⁹ reported 7 cases of epilepsy treated with simulo without appreciable effect, in which conclusion E. D. Fisher and L. C. Gray coincided.

Didier²¹¹_{Dec. 2, '90} recommends faradism for arresting hysterical attacks and for diagnosis in difficult cases of hysterical attack from epilepsy. Twenty-two cases are cited, leading the author to the following conclusions: 1. That faradization is incontestably the best method of preventing or arresting an hysterical attack, as it arrested the crises in all the cases of hysteria reported and in 2 cases of hystero-epilepsy. The method is perhaps less sure in hystero-epilepsy, as one case was not arrested; but it is superior to ovarian compression, which may lead to injury of the pelvis, and which is impossible in pregnancy. 2. This method will distinguish an epilepsy from hysteria, whether the hysteria be the epileptiform type or the convulsive form of Charcot, as in the first the attack is not modified, whilst in the second it is arrested. 3. By this method it is possible to distinguish, in a patient suffering from the true neurosis, the manifestations belonging to hysteria from the epileptiform ones. The procedure consists in applying the electrodes of a moderate faradic current along the track of an aura, i.e., over the epigastrium and the anterior portion of the neck, or in the tonic or clonic period over the neck and through the hand, or through both hands.

Lyon²⁴²_{Apr. 1900} recommends pilocarpine in the convulsive attacks of hystero-epilepsy, and in maniacal excitement one case is cited, the dose used being $\frac{1}{8}$ grain (8 milligrammes) muriate of pilocarpine.

Roman von Baracz⁸⁴_{Feb. 1900} gives the details of 4 cases of epilepsy, in which he tied the vertebral artery, after the procedure first described by Alexander, of Liverpool,⁸⁵⁰_{Nov. 19, '90} with what he regards as successful results, although we must take decided issue with him upon this point. The first case was one of *grand mal*, alternating with *petit mal*, of eight years' duration, the attacks occurring every three to six weeks. After the operation the patient was under observation for 136 days, during which time he is said to have had no attack.

The second case had had epilepsy for seventeen years, the special form not being mentioned; the intervals between the attacks were very irregular, some of them being long and alternating with periods in which sixty to seventy attacks would occur in the twenty-four hours. After the attack the patient was under observation for 109 days, during which time he is said to have had only one slight attack.

The third case was one of *grand mal* of eight years' duration.

The patient was under observation only for thirty-two days after the operation, and had only one slight attack during that period. Before the operation the patient had had no attack for twenty-three days.

The fourth case was one of epilepsy of four years' standing, the type not being mentioned. The interval between the first attack and the second one was three years, and at another time there was an interval of six weeks. As the patient went home five days after the operation no result can be stated.

This is the old, old story of operative procedures, undertaken in the wildest spirit of groping empiricism, to cure epilepsy without first becoming acquainted with the natural course of the disease. A complete cessation of 136 days in one case, of an almost complete cessation of 109 days in another, of 32 days in a third, and no result at all in the fourth, certainly does not constitute evidences of success in the treatment of epilepsy, especially as the first case had had spontaneous cessation of six weeks, the second one had intervals of unknown length, the third one had been for six weeks at one time and three years at another without an attack, whilst the fourth was only under observation five days. These intervals are obtained by a dozen different methods of treatment, and we are entirely at a loss to understand why they should be thought to warrant so severe an operation as ligation of the vertebral artery, even although almost all the cases healed by first intention. Nor is our opinion changed by the results of Alexander's 21 cases, ⁴⁷ of which one died by hæmorrhage from tearing the bandages, ^{July, '98} 8 sustained considerable improvement, 9 were free from attacks for several months, while 3 had no fits for a year; or by the result of Sidney Jones's 3 cases, observed by the author himself, of which one had no attack for three months after operation, the second one slight attack, while the third had three slight attacks.

Lussana and Gallerani ⁵⁷ _{May 12} experimented to ascertain the effect of cinchonidin on epilepsy. Chirore, of Padua, had administered cinchonidin to pigeons, and had removed their cerebral hemispheres without convulsions, whence he concluded that it likely affected the motor zone. Albertoni, on the contrary, found that after the removal of the motor zone of pigeons and dogs cinchonidin produced convulsions, and concluded that epilepsy can proceed from the mesencephalon and medulla oblongata, as well as from the

cortex. Lussana and Gallerani found that no epileptic convulsions occurred after removal of the motor zones when the animals experimented upon had had cinchonidin injected, but that convulsions did appear a certain time after operation, when the irritative influence of the operative trauma had passed away.

Féré²_{Oct. 11} treated 2 epileptic patients with the actual cautery applied to the scalp. One had a reduction of the fits from twenty-one fits in 1886 to seven in the year following, to one in the next year, and none in the first six months of the succeeding one. The other patient had had sixty-three fits in 1886 and forty-five in 1887, in April of which year he was burnt. In 1888 he had only four. Transient improvement had been observed in a large number of patients treated in this manner, and in one the convulsions had ceased, and been replaced by attacks of cutaneous hyperæsthesia.

Wildermuth⁷⁵_{Aug. 1} recommends amyl hydrate in epilepsy where there are frequent attacks; where there is marked bromism, necessitating the occasional cessation of medicine; and in nocturnal epilepsy, alternating with the bromides, and in recent cases given with atropine.

Hill⁹_{Nov. 11} administered borax to an epileptic girl, of neurotic heredity, nine years epileptic, who was having attacks of *grand mal* and *petit mal* every few days, frequently four or five of both major and minor attacks in twenty-four hours. Bromides, nitro-glycerin, hydrobromic acid, had each been tried with only temporary effect. Nickel bromide was used for one year, causing diminution of the attacks from two to nine monthly, but it was discontinued because of stomachic disorder induced by it. Borax, 10 grains (65 centigrammes), three times daily, caused immediate and marked improvement. For three months there were no seizures at all, and for three years the attacks have been greatly diminished in number and severity; there have been intervals of several months, and the greatest number of attacks in any one month has been four, whilst the general health has greatly improved.

Hinsdale⁵_{Jan. 1} reports 2 cases of epilepsy cured by removal of an injured and diseased testicle, and a foreign body from the nose. The first case was a sailor 43 years old, and three months after the operation there had been no return of the fits. The second was a man, 51 years of age; but in this case the convulsions did

not ensue for thirteen years after the trauma, and the relationship between cause and effect is therefore very vague. A third case was in a girl, 17 years old, in whom was found a bean in the nose, which was removed, when the fits entirely ceased. It is not, however, stated for how long a time the patient was under observation.

Morton⁷⁸⁰ operated upon an epileptic boy for equina varus. The fits had been congenital and very frequent. After the operation they ceased entirely, how long is not stated.

PROCURSIVE EPILEPSY.

Ladame,⁵⁷ narrates a case of procurive epilepsy, and comes to the following conclusions:—

1. Procurive epilepsy in the form characterized by involuntary movements forward, generally accompanied by loud cries, by unconsciousness, and seldom by an aura.

2. It is peculiar to childhood and youth.

3. It may be present for many years before merging into ordinary epilepsy; the attacks may change in this transition, and assume first one and then the other form, and the transition may occur early or late, and also suddenly.

4. It is impossible to localize the disease anatomically, but it is not warrantable to assume that a cerebral lesion is the organic cause.

5. It appears to develop especially in persons with marked cerebral lesion, but it is nevertheless probable that it, like all other epilepsies, may occur without demonstrable alteration in the nerve-centres.

6. It is often complicated with moral insanity.

Mairer⁹² arrives at the following conclusions regarding procurive epilepsy:—

1. It accompanies organic lesions of the cerebrum.

2. These organic lesions are scleroses, either trophic or hypertrophic.

3. These organic lesions may attack different parts of the cerebrum, but they may exclusively affect the cerebellum, and the observations so far published would seem to demonstrate that the affection of this latter organ is constant.

Nevertheless, the author admits that there have been quite a number of lesions of the cerebellum which have not been accom-

panied by procursion, and he has collected 17 cases of procursive epilepsy followed by an autopsy, in 10 of which, *i.e.*, 69 per cent., there were attacks of epilepsy, and three times only, *i.e.*, in 23 per cent., impulsive movements. He has not seen any appreciable results from the use of bromide.

Wacquez,²²⁰ reports an interesting case of procursive epilepsy, and ably reviews the different aspects of the malady.

HYSTERO-EPILEPSY.

Rose² presented a case of hystero-epilepsy without previous epileptic history, following a severe wound of the forearm, just above the wrist. A fibro-neuroma of the median nerve was found and removed, with partial improvement.

Courmont,²¹¹ describes a case of hystero-epilepsy, with periodical crossed rhythmical hemichorea, in which he believes that the rhythmical chorea was due to a vasomotor trouble from a neurosis of the great sympathetic, and the author enters into a somewhat subtle and far-fetched argument to demonstrate his conclusions.

Now.?

Smith⁴⁹ is one of the few men who seems to have been warranted in removing the ovaries in a case of hystero-epilepsy. The patient was 25 years old, and had for seven years been subject to fits, at first at two-month intervals, then once monthly, until she had as many as nineteen in one day. They would occur at all times and in all places. Ovarian pressure aggravated them. Many medicinal remedies are said to have been tried and much uterine treatment, all without effect, until moderate dilatation of the uterus and the uterine application of iodized phenol gave some relief. In the meantime the patient's sister, who had suffered from similar attacks, had gradually wasted in strength and died five months after the onset of the disease. After this the patient became rapidly worse, began to emaciate, took to bed, and bade fair to go the road that her sister had gone. The family history was bad, as the father had died of phthisis at 47, a sister with the same disease at 17, besides the sister who has been mentioned. It was therefore decided to remove the ovaries, one of which was found to be twice the natural size, both distinctly cirrhotic in the centre and with numerous cysts near the periphery. The operation caused an entire cessation of the attacks, and ten weeks after it the patient was said to be rapidly improving.

Engelhorn¹⁸³_{Jan 2} has delivered an excellent lecture upon the "Medico-Legal Importance of Epileptic Insanity," in which he describes and comments upon the different forms of the mental type of this disease, as very likely to lead to medico-legal complications.

Charcot,⁵⁵_{July 20} in a clinical lecture entitled "Combined Epilepsy, Hysteria Major, and Morphinomania," gives the history of a patient afflicted with these three affections.

DEFECTIVE DEVELOPMENT OF BRAIN.

Dercum²⁴²_{July} has found the inferior *pli de passage* developed fully up to the general level of the brain in 4 among 75 idiot brains in the collection of Wilmarth. In 2 of these the development existed in opposite hemispheres of the same brain, and in other instances the convolution was large and well developed. It was also twice found in the same brain barely submerged. All of these brains were those of white low-grade idiots. This development of the inferior *pli de passage* was also found in 2 among 33 negro brains examined by A. D. Parker, once in a white brain shown by Charles K. Mills, and in 2 brains of Benedict's,—one a criminal and another a Chinaman.

Dercum²⁴²_{July} describes 2 Chinese brains which, together with 1 described in 1886 by Mills and the 3 of Benedict, make 6 Chinese brains thus far noticed in our literature. These 6 brains exhibited unusual complexity, due to excessive transverse fissurations. The frontal lobes were especially large and complex. There was unusual confluence of fissures, indicative of a low degree of development, such as was often seen in the negro and sometimes in the white brain. There was unusual length of the parallel and Sylvian fissures, also eversion of the orbital and parallel lobes. In the ensuing discussion, Spitzka stated that the *dictum* that a tendency to confluence of fissures indicated a low type of development was not accepted by most anthropologists. The more brachycephalic the skull, the greater was the development of secondary transverse folds. The elephant, which stood among the highest mammals, had a broad skull and a tendency to confluence of fissure. The Chinese were not low in development. The internal *pli de passage* in the negro and idiot were significant only when the general cortical development was poor. The real cause

of the location of the chief sulci lay in the inherent architecture of the brain, and was due to the arrangement of groups of cells and fibres, but the secondary and tertiary sulci might be influenced by other factors, such as the cursory vessels.

Bruce,⁷⁷ describes a case in which there was absence of the corpus callosum, with the following fragmentary history: The patient had been generally backward at school; could read, was good at mental arithmetic, but never learned to write much more than to be able to sign his name; was always somewhat obstinate and eccentric, but in no way vicious; was fond of music, always took an interest in passing events, and was over thirteen years in the employment of one firm as light porter. The manager of this firm had always regarded him as queer, but he discharged his duties satisfactorily. Some time before his fatal illness he became careless and untidy in habit, and indulged in alcohol. He died of pneumonia, and the anatomical peculiarity was accidentally discovered. The author has collected 15 cases of entire absence of the corpus callosum, the cerebrum being divided into two hemispheres,—6 cases of primary partial development of the corpus callosum, 3 cases of absence of the anterior part of the corpus callosum, and 6 cases in which there was an absence of the corpus callosum, or part of it, probably secondary to hydrocephalus, hydatids, or tumors, the majority of them being due to a primary arrest of cerebral development. The author claims that in all these cases in which there has been absence of the corpus callosum there has always existed some other grave defect; whilst, on the other hand, several cases show that where the brain is otherwise well developed there may be no disturbance of mobility, co-ordination, general or special sensibility, reflexes, speech, or intelligence, whether the defect of the corpus callosum be primary or secondary; so that he rejects the idea that the corpus callosum co-ordinates the corresponding convolutions of the opposite hemispheres.

Roscoli,⁷⁸ investigating the question of fronto-facial asymmetry, examined 388 lunatics of different types and 100 individuals of sound mind, finding 6 of perfect symmetry only in 3 per cent. of the insane, and 16 per cent. of the healthy. The author attaches no importance to asymmetries of lesser degree.

DISEASES OF THE SPINAL CORD.

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SUSPENSION IN THE TREATMENT OF NERVOUS DISEASE.

THE literature of the previous year was nearly destitute of contributions to the therapeutics of diseases of the spinal cord. This year, however, the therapeutic articles outweigh in number and volume all else upon the subject, though confined almost exclusively to suspension. The history of this subject will form in the future one of the interesting chapters in the records of therapeutic investigation, chronicling, as it will, the introduction of a method of treatment which remained unnoticed for several years after the announcement of its discovery, until again brought to light by an eminent clinician, and subjected during the following six months to a trial by noted neurologists throughout the world, calling forth reports from more than fifty observers and furnishing material for more than one hundred articles in medical journals. Few new remedial measures have been so promptly and universally tried by the profession. It is significant, however, that during the first six months of the year the medical press was overwhelmed with articles upon suspension, while during the last three months contributions have come in sparingly: few writers have reported additional cases or given later results upon their previously-published cases. All this is partly accounted for when we consider the incurability of the diseases treated; any means of relief offered by eminent medical authority would be grasped by every physician having tabetic patients, who, encouraged by the notoriety given to the matter by the public press, would become willing subjects for such a procedure. A large part of the available material in hospital and private practice was probably put to the test at once all over the world, so that a less number of available cases remained for later reports. It is yet too early to determine whether a more important cause of the paucity of later reports does not lie

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in a dying out of enthusiasm on the part of both patient and doctor. One observer remarked to me that improvement finally came to a standstill; his patients tired of the treatment, and one by one left without notice. The almost universally favorable reports respecting the amelioration of certain symptoms increases our surprise at the subsequent silence, and raises the query as to how important a factor suggestion may be in the problem, or whether a cessation of improvement or subsequent aggravation of symptoms, the result of treatment, may not have occurred in many cases.

History of the Method.—Suspension was used in 1829 by J. K. Mitchell, of Philadelphia, for affections of the cord secondary to vertebral disease, and, later, by his son, S. Weir Mitchell.⁵ J. von Motschutkowski, of Odessa,⁵⁸⁶ No. 21, '78; June 94,⁴ published an article "On the Application of Suspension for the Treatment of Certain Spinal Diseases," though but little notice was taken of the subject until F. Raymond, of Paris, brought the matter to the attention of Charcot, having observed Motschutkowski's method and results while on a scientific mission to Russia in 1888. The usual version is that, while using Sayre's plaster jacket on a tabetic patient with a spinal curvature, he noticed improvement in certain symptoms. It appears that Motschutkowski observed an increase of from 2.5 to 5 centimetres (1 to 2 inches) in the length of the body during suspension, executed for the purpose of fitting Sayre's corset on patients affected with spondylitis. This led to the inquiry as to how the cord, its membrane, and its nerve-roots were affected by suspension, and whether curative effects might accompany it. With this problem in view he commenced a series of clinical experiments. The first patient had degenerative atrophy of the posterior columns. He was suspended ninety-seven times with the following results: The lancinating pains entirely disappeared; ataxia diminished; retarded conductions to painful impressions became less; certain paræsthesia disappeared; muscular power in the extremities increased; the patient could not only stand, but could walk with closed eyes; the genital functions improved; sensibility to pain returned in the feet; tactile sensations improved; and wasted muscles increased in volume. The weight of the body, the knee-jerk, and changes in the visual apparatus remained unaffected. He treated by suspension, in all, of tabes, 15 cases; lateral

sclerosis, 3 cases; chronic diffuse nephritis, 1 case; chronic meningo-myelitis, 1 case; disseminated sclerosis, 1 case; sciatica, 1 case; multiple neuritis, 1 case. A favorable result was obtained in the tabetic only, the other diseases not being influenced one way or the other by the treatment. With two exceptions all the tabetic patients improved more or less, shown principally by diminished pain, reduction of paræsthesia, increased muscular power, and lessened ataxia. Of the 2 cases not improved, both were in the neuralgic stage; in one, pain became less, but weakness of the legs rapidly followed, and the other developed retention of urine.

The relations of the cord and its nerve-roots to the vertebræ during suspension he sought to determine by experiments upon the cadaver. He removed the fifth and sixth spinous processes of the dorsal vertebræ, disturbing the muscles and ligaments as little as possible, and observed through the opening that the nerve-roots lie in a nearly horizontal position; under suspension, however, they assume an almost perpendicular position. The entire cadaver was increased 6 centimetres ($2\frac{1}{4}$ inches) in length; from the second cervical to the fourth lumbar vertebra, 2.25 centimetres ($\frac{9}{16}$ inch). Marks made on the skin, the vertebra, and the dura, when not suspended, separated under suspension to the extent of 14 millimetres ($\frac{1}{2}$ inch) between the dural and the vertebral marks. The posterior were apparently stretched more than the anterior roots. The extension does not appear to be due to variations in the physiological curvatures of the spinal column, but to the relaxation of the muscles and ligamentous structures. Sometimes in suspension there is no change in length, or there may even be a shortening of 1.5 centimetres ($\frac{3}{8}$ inch). This occurs at the beginning, before the patient is accustomed to suspension, and on account of muscular strain, particularly of the shoulders, producing tension of the muscles of the shoulders and back. Sayre's suspension apparatus was employed, the smaller balance being dispensed with. Motschutkowski says that under no circumstances should the procedure be left to unskilled persons, but that it should be done by the physician himself. The lifting and lowering of the patient should be performed slowly and gradually. The straps must fit evenly, and the first suspension must never last longer than from two to five minutes. The patient

should transfer the entire weight of the body from the arms to the head every twenty to thirty seconds. It is a sort of gymnastic exercise for the arms.

Respiration is increased in rapidity (from 16 to 24) during suspension, becoming more costal; it is rendered difficult, as shown by pneumo-manometrical measurements, pressure becoming reduced from — 30 millimetres (1 inch) for expiration + 80 for inspiration while standing to — 10 for expiration + 60 for inspiration under suspension. The pulse becomes more frequent. Sphygmographic curves (femoral artery) show increased blood-pressure during suspension, the diastolic wave approaching the apex.

In considering the effect produced by suspension he admits that there is no decided stretching of the nerve-roots, though there is a change in position; and thinks that the nerves of the lower extremities, after their exit from the vertebra, may have undergone some extension, but that it is to the circulatory changes in the cord that we are to look for the chief cause of the improvement which follows. He refers to Adamkiewicz's theory of the destruction of blood-vessels of the posterior columns as a cause of the degeneration in these tracts, and suggests that measures to improve the collateral blood-supply of these parts may preserve or improve their functions; and that this is possibly accomplished by lateral pressure and extension of the vessels during suspension. He is far from maintaining that it is possible to cure tabes by means of suspension, but believes that it is an improvement upon the usual methods of nerve-stretching, having the advantages that the patient's occupation is not interfered with, that the treatment is painless, and under proper precaution is harmless; nor has he observed the trophic disturbances which sometimes accompany nerve-stretching. He considers as contra-indications for suspension the following conditions: Diseases of the heart and compensatory disturbances; sclerosis of vessels and amaurosis; marked pulmonary emphysema, pulmonary cavities, and tendency to hæmoptysis; previous apoplectic, epileptic, or epileptiform attacks, or a tendency to syncope.

Suspension should not be repeated too frequently (at intervals of one or two days), nor continued too long (not over ten minutes). When too frequent, as once or twice a day, or too long continued, as up to twenty minutes, the following unpleasant

effects have been observed: Sudden weakness of the lower extremities, pain along the vertebral column, vertigo, loss of appetite, drowsiness, hæmorrhage within the sclera, retention of urine, and tonic spasm in the legs of brief duration. All other methods of treatment were discontinued while suspension was being tried. From what follows it will be found that comparatively little modification has been made of Motschutkowski's method or its results.

Raymond,⁹⁴ refers to the method in an article on tabes, as does Marshall.¹²³⁸ Charcot's first public announcement of the method, after a trial of three months, was reported by Gilles de la Tourette,⁷⁸ Jan. 11; 18 cases had then been treated. An additional article by the same writer,⁷⁸ Feb. 29, upon the technique of the method as practiced by Charcot, was succeeded by papers by Saundby,² Feb. 29 to Mar. 9; Lespinasse,⁷⁰ Feb. 24, service of Vergely and Picot (2 cases), Eulenberg and Mendel,⁴ Feb. 28, Apr. 1, June 1 (40 cases), de Watteville,⁶ Mar. 17, Dana,⁹⁹ Oct. 21 (16 cases), S. Weir Mitchell,⁹ Apr. 12 (new apparatus), Althaus,⁶ Apr. 12; June 22; Oct. 12 (29 cases), W. J. Morton,⁵⁹ Apr. 17 (6 cases), Abadie and Desnos,⁷³ Apr. 27, Gorecki,¹⁷⁷ May 6 (1 case, death), Booth,¹⁰¹ May 5, Bernhardt,⁴ May 17 (21 cases), W. A. Hammond,¹ May 11 (5 cases), Sinkler,⁷⁸⁰ May 11, Land,¹⁸⁸ May 12, Oct. 21, Erb,⁷⁵ July 1 (6 cases), Stewart,⁹ June 1 (14 cases), Simpson,³⁹ June 1 (2 cases), Waitzfelder,⁵⁹ June 1 (6 cases), Blocq,¹⁴ (contra-indications), Ladame,¹⁹⁷ June 20 (16 cases), Skinner,¹ June 20 (dangers of suspension), Shaw,¹⁰⁹ July, Aug. (15 cases), Teissier,²¹¹ July 14 (2 cases), Dujardin-Beaumetz,⁶⁷ July 15 (25 cases), Tiberghien,²⁷⁶ July 20 (26 cases), Mouisset,²¹¹ Aug. 11 (8 cases), Kellogg,⁷⁷ Aug. (2 cases), De-Renzi,⁵⁹⁶ Aug. (13 cases), Kintoch,⁷⁸⁰ Aug. 21 (apparatus), Schilling,⁸⁴ Aug. 6 (15 cases), Hoffmann,¹⁰⁴ Aug. 21 (1 case), Stallard,¹⁴⁷ Sept. (15 cases), Abrams,¹⁴⁷ Sept. (2 cases), Short-Saundby,² Sept. 14 (16 cases), Tompkins,⁸¹ Sept. (dangers of suspension), Renaut,²¹¹ Sept. 15 (1 case), John R. Lunn,² Oct. 5 (5 cases), Churton,² Oct. 12 (2 cases), Haushalter and Adam,⁷³ Nov. 2 (29 cases), Garry,² Nov. 5 (4 cases), Russell and Taylor,⁶ Oct. 12 (16 cases), Clark,¹⁵ Nov. (14 cases). There are also good reviews of the subject by Raoult,⁷³ ⁹⁴ June 22; July Dujardin-Beaumetz,⁶⁷ July 15, Regnier,³⁴⁵ July, Riggs,¹⁰⁵ Aug. 15, and Edinger.⁵⁴ Sept. 15

In the literature given, about 560 cases are reported, of which about 460 are cases of tabes. This includes 114 cases accredited to Charcot, of which he excludes all but 50 as not having been sufficiently long under observation. If we exclude Althaus's cases (29), details of which are not given, except the statement that the majority were improved, and those of Dujardin-Beaumetz (25), who makes a similar statement, there are left about 340 cases.

These show improvement, it is maintained, in 70 per cent., no improvement in 30 per cent., and aggravation in 6 per cent. of the cases. Nearly all the writers quoted speak favorably of the treatment, those most unfavorable being Erb (of whose 6 cases, 2 were slightly improved, 3 were made worse, and death resulted in the remaining case), Saundby and Short (6 cases without improvement), Russell and Taylor (16 cases : 3 improved, 7 unimproved, 6 made worse), and Churton, who is the only writer positively antagonistic to the method. Taking the larger groups of cases, we find that Motschutkowski had improvement in 87 per cent., Charcot in 76 per cent., Eulenberg and Mendel in 68 per cent., Dana in 66 per cent., Tiberghien in 73 per cent., and Bernhardt, Marina, Dujardin-Beaumetz, and Althaus, estimated at about 50 per cent. Of the smaller groups, with the exception of the unfavorable reports mentioned, none of them run under 30 per cent., most of them over 70 per cent. This is a remarkably rose-colored statement, but it should be remembered that all degrees of improvement are included in it. No cures are reported.

Apparatus and Method.—The description given by Gilles de la Tourette of Charcot's method may be taken as a standard. Sayre's well-known suspension apparatus is used. A curved bar of iron is hung by a central ring to the pulleys by which the patient is lifted; at the hooked extremity of the bar are suspended the looped straps for the axilla, and the head-piece has rings which rest in notches in the bar. This head-piece has broad straps, which pass under the chin and the occiput. Care is required that they fit evenly and comfortably, sufficiently tight to prevent slipping, but not enough to compress the blood-vessels of the neck. In some cases it may be necessary to pad them with some soft substance, in order to properly distribute the pressure. The patient's coat and collar having been removed to give freedom to the arms and prevent compression of the neck, the head-straps are properly adjusted and the arms are slipped into the axillary loops. The latter are an important part of the apparatus, as they relieve the head from overtraction. If too short, they compress uncomfortably the axillary vessels and nerves; if too long, the head is not relieved. When all is ready, the physician or his assistant slowly and steadily draws upon the pulley-cord, the patient being cautioned not to make any movements, so that he may avoid lateral and rotatory displace-

ment. As the toes leave the floor, the patient should be steadied to prevent swaying, and the time of suspension must be carefully noted. Traction upon the head may be varied by arm movements of abduction and adduction. The duration of suspension depends on the body-weight and the patient's toleration. For the first trial, half a minute is sufficient, the maximum being three or four minutes, to be reached after six or eight trials. Pain or fatigue should be avoided. After the required time has expired, the patient should be let down gradually, without jerking, and supported during the removal of the apparatus; then he should rest for a few minutes in an arm-chair.

Gilles de la Tourette advises against the use of the tripod, which may be upset by the patient, and prefers fixing the apparatus to a ring or hook in the ceiling. Althaus uses the tripod, to one leg of which a winding reel is attached whereby the patient may be raised and lowered more steadily than by the hands alone. Hammond employed a frame-work and windlass, at first with both arm and head supports, but later without the axillary loops, suspending by the head alone, and introducing a spring-balance dynamometer to determine the traction effected, "convinced," he says, "that the spinal cord can only be stretched by a force applied to the neck and head." Mitchell, on the other hand, does away with axillary supports and suspends by the elbows, which rest in slings, the forearms being flexed across the body and the arms confined to the thorax by a cross-band. The head is supported by an additional pulley. He says that suspension may be continued for twenty minutes with perfect ease. De Watteville, Shaw, Ladame, Land, and others also use a spring dynamometer to determine the weight producing traction, and consider it indispensable to judicious treatment. Kintoch mounts his apparatus on a plank which may be inclined at any angle, thus varying the traction; crutch-heads affixed to sliding-screws replace the axillary loops, and a step upon the lower end of the plank enables the patient to begin or cease suspension at will. Dujardin-Beaumetz has used Pochery's gymnastic apparatus upon his tabetic patients with satisfaction. He also uses Maury's method of obtaining photographic tracings of the gait to show the degree of improvement in locomotion under treatment by suspension. The patient, dressed in black, walks in front of a black background; electric

lights are placed on the head, the shoulder, the hip, the knee, and the ankle; instantaneous photography registers the luminous points many times a second, and on uniting these points on the tracing by lines, a representation of the gait is obtained. Binzwanger employed a modified Kapeller apparatus. The patient, being extended upon a bed, is lifted by a band about the thorax, the head being supported but not subjected to traction.

Duration of Suspension.—Motschutkowski, as we have seen, places the limit at ten minutes, a longer period than is allowed by Charcot, who is followed by most observers in commencing with a suspension of half a minute, increasing each time by half a minute until three or, at the outside, four minutes have been reached, three minutes being the average; though Mitchell says that elbow suspension may be comfortably continued for twenty minutes.

Frequency of Suspension.—Motschutkowski's rule of suspending patients every other day is followed by most observers, though Waitzfelder obtained improvement under suspension three times a day. The number of suspensions was very variable, from a few to more than a hundred.

Results of the Treatment of Tabes by Suspension.—Motschutkowski's statements concerning improvement have been given. Charcot's experience is as follows: Improvement in the gait and lessened inco-ordination were noted after the first suspension; ease in walking, lasting at first only a few hours, but becoming permanent after eight or ten suspensions; after twenty or thirty suspensions, Romberg's symptoms disappeared. Next in order of time was the disappearance of various vesical symptoms, micturition becoming regular and incontinence disappearing; fulgurating pains were lessened, and in some cases disappeared entirely; complete impotence was sometimes replaced by sexual desire and erections; disappearance or diminution of numbness in the feet was observed; sleep improved; the pupillary phenomenon and abolished tendon reactions were not affected. He thinks that further tests are necessary to determine the therapeutic value of the procedure, but considers the results encouraging respecting a disease which has heretofore defied treatment.

In 34 cases of tabes, Eulenberg and Mendel noted a decided improvement in general health and sleeping power in at least 16 cases, diminution of Romberg's symptoms and vesical symptoms

in 16 cases, and in 1 case incontinence was increased. Decided improvement occurred in neuralgic symptoms, particularly lancinating pains, in 10 cases; improvement of motility in 9 cases, of paræsthesia in 5 cases, hyperæsthesia and anæsthesia in 3 cases, of impotence in 3 cases, of headache in several cases.

These authors, though unwilling to express a final opinion upon the value of suspension, say that, while the method is not entirely worthless, it has not fulfilled the enthusiastic expectations warranted by earlier announcements.

Dana says that the nature of the improvement was oftenest in the gait, strength, and capacity for locomotion generally, and, in a subjective sense, of better physical health. Next to this, there was improvement in regularity of the movements of the bowels, in control of the bladder, in sexual power, and in the pains; in one case vision was improved. In no case did the knee-jerk or the light reflex return. He considers suspension "an undoubted acquisition to the therapy of tabes." In 21 cases very marked improvement occurred in 4, much improvement in 3, slight improvement in 7, no improvement in 4, and in 3 cases treatment was discontinued.

Althaus remarks that in some of his cases the results have been brilliant, in the majority they have been good, while in a minority no benefit has resulted.

Bernhardt reports that among his patients were some enthusiasts, who, immediately after their first suspension, described improvement in walk, in lancinating pains, vesical functions, and in general health. But, even making allowance for psychical effects, he is convinced of the beneficial effect of suspension, more than half of his patients, upon their own admission and his observation, having received decided benefit; though with some patients no effects whatever were observed. Of course, no cures were effected, and no effect observed upon the knee-jerk, the optic-nerve atrophy or pupillary inaction. Some patients continued free from pain for over a month after the cessation of suspension, returning then for treatment of recurrent pain. Others remained away altogether after ten suspensions or more, probably from not having obtained the expected relief.

De Renzi had no result in 3 out of 7 cases of tabes; 4 patients showed improvement in the lancinating pains, 1 being

entirely relieved and the remaining 3 decidedly ameliorated. Erb's cases, though but 6 in number, are of interest from the unfavorable results obtained: Case 1. Twenty-three suspensions; at first, slight diminution of paræsthesia and improvement in gait, later becoming progressively worse. Case 2. Thirteen suspensions; he became worse. Case 3. A heavy man; eleven suspensions; slight improvement in subjective symptoms at first; after the sixth suspension he had vertigo, thoracic constriction, exhaustion, and sudden death four days after cessation of treatment, with symptoms of vagus paralysis. Case 4. Thirteen suspensions; improvement in sensation and gait at first; lancinating pains worse than ever before; later they disappeared. Case 5. Slight improvement after five suspensions. Case 6. Ten suspensions; aggravation of symptoms; vesical symptoms better at first, worse later. Erb says that there are certain undoubted effects of suspension which cannot be accounted for by psychical action (auto-suggestion). He attributes his unfavorable results, in part, to the heavy weight of some of his patients, and to their being mostly in the early stage of rapidly-progressive tabes.

Stewart, in 8 cases of tabes, observed first, and most strikingly, relief from ataxic and lancinating pains, this occurring in all his cases after a very few suspensions, and most promptly in the more chronic cases. Bladder and rectal symptoms disappeared in 2 patients and increased sexual desire in 1; diminution or loss of sexual desire present in 5, improved in 1; tactile anæsthesia improved in 3, slightly in 1 other, and not at all in the 4 remaining patients. A somewhat melancholic condition disappeared in 5 patients, due, he thinks, to lessened pain and ataxia. No changes were observed in the knee-jerk or ocular symptoms.

Russell and Taylor say of their 16 cases that in 3 improvement occurred, consisting of a less ataxic gait and greater steadiness in standing. In no case was there ability to stand with the eyes closed; nor was there relief of the knee-jerk or pupillary reaction to light. In one case the pains were somewhat relieved, though in none of the cases had they been a recent or prominent symptom. In the greater number of cases there was no improvement; most of these remained in practically the same condition, but in more than one there was an evident retrograde tendency.

Clark, who reports 14 cases of tabes, describes the first sign of improvement as increased steadiness in walking and standing,

ability to walk greater distance, lessened giddiness, and increased confidence in crossing crowded streets. In these respects a few patients observed improvement after six, but in the majority no positive change was noted until after ten or twelve suspensions. Subsequently, there was increased muscular power and a sense of general well-being. Defective sensation in the feet and legs improved rapidly from the first; lightning pains, present in 9 cases, were relieved in 6. This was one of the latest symptoms to show improvement, after fifteen or more suspensions. Disorders of urination were relieved temporarily in 2 cases, but remained unchanged in the others. Sexual power, when lost, as a rule improved, but not invariably. Sleep and appetite improved, and the bowels acted more regularly. In one case a gastric crisis with diarrhœa occurred after suspension upon three occasions. The tendon reaction and defects of vision remained unchanged, except that in one case the left knee-joint was not entirely lost, and became more active under treatment. In 2 cases sluggish pupils became brisker, but he was unable to obtain Darier's ⁷³ results of improved vision with optic-nerve atrophy.

Ladame, after treating 15 cases, confirms the results obtained by Motschutkowski and Charcot, improvement being shown by diminution of the fulgurating pains, amelioration of vesical symptoms and of insomnia. With 2 patients, Romberg's symptoms disappeared; plantar anæsthesia was greatly relieved in several cases; in others there was no result.

In the majority of cases, after a rapid amelioration following the early *séances*, due, perhaps, to psychical effects, there succeeded a temporary aggravation of the symptoms quite discouraging to some subjects, while, with those who had the patience to continue, a later period of amelioration was reached, ordinarily between the twentieth and the thirtieth *séances*.

Renaut ²¹¹ reports the return of the knee-jerk in a tabetic after suspension. Althaus reported a similar result.

Injurious and Disagreeable Effects.—Charcot, in his first article, says that suspension may be instituted with confidence, and when properly applied is entirely inoffensive. Motschutkowski's warnings were not heeded in all cases, for death has resulted where the patients conducted the proceeding themselves or trusted it to inexperienced attendants. Hammond's prediction ("we shall

some day hear that a neck has been dislocated or sudden death produced by the unskillful use of this method") was promptly fulfilled. Gorecki reports the death of a tabetic who, with the aid of his footman, attempted his own treatment by suspension. During the eighth suspension, while he was still in the air, he lost the power of speech and hearing, though sight, intelligence, and power of movement were retained. Subcutaneous injections of ether were given by a physician to restore him. He became worse, however; swallowing was impossible, and on the same evening he lost his vision. Paralysis of the arms and thorax supervened, and death from asphyxia resulted within twenty-four hours. There is also the case⁶ of a female who was strangled during suspension, and the case¹ of Dr. Vincent, of Clifton Springs, N. Y., who suspended himself and died from strangulation. Erb's case, already cited, died after suspension, presumably from paralysis of the vagus. Another fatal case is reported in an Italian journal. Besides these fatal results, other disagreeable effects have been reported. Tompkins⁸¹ refers to one of Hammond's patients who became cyanotic and unconscious, with dilated pupils, but normal pulse, while under suspension, and was subsequently attacked with convulsive movements. Skinner¹ calls attention to the case of a patient at the Vanderbilt clinic who became motionless and unconscious while being suspended. A movable handle, catching in the pulley, delayed the lowering of the patient, prolonging the effects. He subsequently regained consciousness without bad effects. Skinner warns us against the use of handles, knots, and catches in our apparatus. Mouisset describes, as transient effects of suspension, pains in the occiput and neck, disturbances of vision and hearing, vertigo, tendency to syncope, formication in the extremities, pain in the back, with a girdle sensation. Teissier has observed vertigo and pain in the arms and albumen in the urine of a female tabetic whose urine was normal previous to suspension. Dana had no accidents, though 2 of his patients came near fainting. Hicky describes vertigo, pain in the thigh and in the back. Charcot saw œdema of the extremities after suspension in a male of 55, who had atheromatous arteries. Syncope occurred in 2 cases, aggravation of paretic symptoms in another, and transient radial paralysis from compression; also rupture of an atheromatous artery from axillary compression. Dejerine has seen radial paralysis from

compression during suspension. Bianchette observed an increase of amaurosis in 2 cases. Marina also observed bad effects on the optic-nerve functions. Clark says that the unpleasant symptom most commonly complained of is great giddiness during suspension and for a few minutes after it is over, due either to improper adjustment of the bands and straps supporting the head, producing pressure on the cervical veins, or to the patient being raised or lowered in a rapid and jerky manner, or to movements of rotation or to holding the breath. Giddiness is aggravated by shutting the eyes, especially toward the end of suspension. Pains in the neck and lumbar spine are not uncommon, usually due to improper adjustment of the supporting bands and cords. Burning pains and temporary paralysis of the arms occur from axillary pressure. A tendency to syncope may often be obviated by deep breathing. Unpleasant symptoms, unless trivial, demand the bringing of the suspension to a close. It is well not to suspend immediately after meals. Defective or carious teeth require a piece of India-rubber between the gums.

Bernhardt gives two instances of unconsciousness, with pupillary dilatation and convulsive movements.

Blocq has formulated the following contra-indications for suspension: Organic debility from any cause, anæmia, œdema, obesity, phthisis, emphysema, and other chronic affections of the air-passages; cardiac and vascular affections, as atheromatous arteries, tendency to vertigo, congestion, or apoplectiform attacks, valvular lesions of the heart; neuropathies with spastic phenomena, as multiple sclerosis, spastic paraplegias; defective teeth, and tendency to spontaneous fractures.

Theories of Action.—Motschutkowski's views as to how suspension produces its effects have been given. Charcot accepts his theory, also Bernhardt. Althaus, however, has broached what may be called a grosser theory. He says that it is highly probable that part of the influence of suspension, by which the spinal cord is efficiently stretched, is owing to the breaking down of adhesions from chronic meningitis, thus allowing a freer transmission of nervous influence along the nerve-tubes, more especially those which run on the surface of the posterior columns. He assumes that, by the process of stretching the spinal cord, the overgrown and unduly-hardened neuroglia may be loosened and broken down,

with the effect that those nerve-tracts which have, to some extent, survived the sclerotic process are freed from compression and become better nourished; that suspension also has a beneficent influence on the medulla oblongata, as it stimulates the centres for vasomotor and cardiac action and for digestion. I consider that there is no evidence that anything like the amount of force necessary to produce such a breaking down of adhesions, as the theory implies, is effected by suspension. Motschutkowski's experiments show how very light is the amount of stretching which occurs. Stretching of the spinal cord is the theory favored by Hammond, Dujardin-Beaumetz, and others. Most of the writers are silent as to its mode of action.

Land has experimented with dynamometers, and finds that the variation in traction upon the head is very great; as the arms and thoracic muscles become fatigued, the traction upon the head rapidly increases. The degrees of elongation of the spinal column he found depended also upon variations in muscular relaxation.

Suspension in Other Diseases than Tabes.—Motschutkowski obtained benefit in his tabetic patients only. In paralysis agitans Charcot reports 4 cases, with some improvement in sleeping, diminution in the sensation of burning, and lessened stiffness; lessened antipulsion in 1 case, but no change in the tremor. Eulenberg and Mendel obtained no effects in 2 cases, and but slight improvement in one other. Dana, in his first article, reports improvement in 1 case and lessened stiffness in a second; but in his second article he says "it does no good in paralysis agitans, and rarely in the various forms of chronic myelitis." Abrams reports improvement in the gait, the tremors, and the facial expression in 1 case, but no effect in a second.

Disseminated sclerosis is reported upon favorably by Eulenberg and Mendel (1 case), by Tiberghien (2 cases), by Abrams (1 case), by Shaw (1 case), and unfavorably by Charcot (2 cases). Spastic paraplegia, according to Stewart, improved in 1 case quite decidedly, in another but slightly, a third remaining unchanged. Adam and Haushalter's 2 cases improved; Abrams's 4 cases improved; Charcot's case was aggravated. Neurasthenic impotence improved in Charcot's 2 cases and in Tiberghien's case; Charcot's case of Friedreich's disease improved. Ataxic paraplegia improved in 1 case, with doubtful results in a second (Stewart). No change

was effected in Eulenberg and Mendel's case of traumatic neurosis, but improvement occurred in Adam and Haushalter's 2 cases. Hammond reports improvement in a case of antero-lateral sclerosis, also Tiberghien in 1 case. Stewart reports improvement in a case of subacute dorso-lumbar myelitis; Tiberghien in compression myelitis from Pott's disease (disappearance of symptoms); Abrams in Pott's disease (improvement in gait and diminished curvature). Mitchell found no improvement in 2 cases of Pott's disease.

Renzi reports a cure in a case of chronic spinal meningo-myelitis; Adam and Haushalter, improvement in 2 out of 3 cases of diffuse myelitis; and Eulenberg and Mendel observed no effect in a case of chronic myelitis. Of 2 patients with chronic sciatica, Abrams found one improved, the other made worse, by suspension. Out of 6 cases of neuralgia, 4 were relieved in Adam and Haushalter's cases. They also report improvement in nocturnal incontinence (1 case), in 4 cases of neurasthenia and 10 of hysteria, while no improvement followed in 2 cases of hypochondriasis and 1 of double athetosis. Suspension has also been tried in general paralysis. Régis and Friese¹⁸⁸_{Oct. 20} treated 12 patients for a month. They observed increased functional activity, both physical and mental; after the third or fourth *séance*, increased suppleness and agility, most marked in patients plunged in a torpor; also diminution in tremors, in faulty gait, and in speech disturbances. The effects were most noticeable a few hours after suspension. In some, excitement became so great as to necessitate a cessation of treatment.

The author believes suspension will be found beneficial in general paresis in its torpid form and in the ascending or medullary form. In 2 cases of lypemania, with depressive periods, improvement occurred under suspension.

SPINAL MENINGITIS.

Voigt,⁸⁹_{Sept. 19} reports at length 4 cases of spinal meningitis in adults, ending in recovery.

TUMORS OF THE CORD.

Syringomyelia.—Material continues to accumulate adding to our knowledge of this comparatively rare pathological state. Numerous cases have been reported during the year in which this

diagnosis was made, but in no case verified by an autopsy; while the 3 or 4 cases in which an autopsy revealed syringomyelia the diagnosis was not made during life, showing that the recognition of this condition is not so easy as some writers have led us to infer. There are certain groups of symptoms following a certain course which point most conclusively to syringomyelia or gliomatosis, as shown by the characteristic description of Schultze, Kahler, Baumler, Roth, and others; but that other groups of symptoms are frequently produced by syringomyelia, simulating a variety of diseases, is undoubtedly also true. Nor can the pathology always be referred to any single pathological process, such as gliomatosis; a variety of morbid changes having been found. To refresh the reader's mind upon this subject we reproduce in part an excellent description of gliomatous syringomyelia by Dejerine.² Syringomyelia commences from the 15th to the 30th year. Its onset is insidious, sometimes beginning by dull pains in the cervical or cervico-brachial region, in other cases by fatigue and weakness. At times alterations in thermal sensibility open the scene, patients even burning themselves without feeling it. After a time muscular atrophy appears, starting almost always in the muscles innervated by the cervical enlargement, and distributed according to the Aran-Duchenne type. The atrophy usually progresses very slowly, and, as in chronic poliomyelitis, involves first the small muscles of the hands, which take on the simian attitude or acquire the deformity called *griffe cubitale*. The atrophy gains little by little upon the muscles of the upper extremities and thorax. Usually, it is more symmetrical than the atrophy of chronic poliomyelitis, though it develops much more slowly. The diseased muscles present fibrillary contractions, and may exhibit the partial reaction of degeneration. The olecranon jerk is abolished, the atrophied muscles are flaccid, and loss of function is proportionate to the atrophy. In the great majority of cases the muscles of the face and the lower extremities remain intact. The frequent existence of cyanosis of the atrophied extremities is to be noted. Tests of sensibility should be made most methodically, for in syringomyelia the sensory disturbances are disassociated or partial, and it is this which enables us to recognize the disease with certainty during life. Tactile sensibility is preserved. In 2 cases presented, tests with the æsthesiometer showed that perception was within

physiological limits on all parts of the body. The sense of locality, of pressure, of position of the members, and the muscular sense were normal. The thermal sense, on the contrary, is profoundly modified, even in the early stages of the affection. In 1 case the patient was unable to distinguish a variation in temperature between 10°, 90°, and 100° C. (50°, 194°, and 212° F.). Patients burn themselves without being conscious of it, producing small cicatrices seen on the fingers and hands. Sensibility to cold as well as to heat is affected. Sensibility to pain rarely remains normal. Roth, however, has encountered a case in which thermal anæsthesia existed with muscular atrophy only. Usually, analgesia and thermal anæsthesia accompany each other, invading the same regions,—not distributed in patches, but occupying extensive areas, the skin of the face and even the mucous membranes sometimes becoming involved. In rare cases an entire lateral half of the body may be affected. To these fundamental symptoms of syringomyelia others may be added, some constant, like scoliosis of the vertebral column; others more or less frequent, like trophic disturbances, such as overgrowth of the epidermis and nails, eruptive bullæ and glossy skin, fragility of the bones, separation of the epiphyses, articular lesions, panaris (paronychia), with loss of the phalanges, and sometimes excessive secretion from the skin in the areas of disturbed sensation. While muscular atrophy, scoliosis, frequent trophic disturbances, and marked alterations of the pain and the temperature sense, with integrity of tactile sensibility, are the principal symptoms of syringomyelia, yet in rare cases the Aran-Duchenne type of atrophy is absent, or, what is still more rare, tactile sensibility is lost; the latter condition, however, only occurs in advanced cases of long standing.

The pathological anatomy of the affection is to-day well known. It consists not in an inflammation of the cord (a myelitis), but of a medullary neoplasm,—a glioma of the spinal cord. The lesion is located in the centre of the cord, occupying almost the entire length. At certain points, the neoplasm may be easily detached from the normal tissue; at others, it is intimately adherent, sometimes presenting cavities whose pathogeny still remains undetermined. The glioma develops eccentrically, compressing the spinal cord, producing consecutively the symptoms already described. The growth is usually most pronounced in the

cervical region, explaining why the muscular atrophy and sensory troubles are localized most frequently in the upper extremities. Less frequently the gliomatous prolongations extend laterally in the gray or white matter of the cord, modifying the symptomatology; sometimes producing in the lower extremities symptoms of spastic paraplegia, this, however, being the exception. It should be remembered, then, that the symptoms of syringomyelia are the result of a medullary compression exerted externally and internally by a central neoplasm of the cord. This compression explains the disassociation of the characteristic sensory troubles. In effect, the posterior column, which contains tracts for the transmission of tactile sensation, escapes compression; but this is not the case with the central gray substance, which transmits thermal and painful impressions. The muscular atrophy must be attributed to compression of the anterior horns. The diagnosis of syringomyelia is easy when the white substance is not involved by the glioma. It may be distinguished from myelopathic muscular atrophy, progressive myopathic muscular atrophy, and amyotrophic lateral sclerosis by its sensory disturbances. Cervical hypertrophic pachymeningitis is differentiated from it by its pains, contractures, rigidity of the neck, attitude of the hands, its mode of development, and the absence of partial sensory disturbances. There remains for consideration Morvan's disease and leprosy. The former presents, at first sight, a great resemblance to syringomyelia; the muscular atrophy and scoliosis are the same; the thermal and painful sensations are also profoundly affected; trophic disturbances occur, such as panaris, with loss of the phalanges, and the course of the disease is extremely slow; but in nearly all of Morvan's cases tactile sensibility was altered, as well as the thermal and painful sensibility. Besides, a recent autopsy by Gombault and Reboul shows that Morvan's disease is characterized anatomically by a very intense peripheral neuritis, connected with very slight lesions of the posterior columns. This disease should therefore be assigned to the multiple neuritis group, in absence of disassociated sensory disturbances. It has not been proven that all of Morvan's cases had the same pathology; some may really belong to the syringomyelic type, for in one of his cases tactile sensibility was normal. In anæsthetic leprosy (systematized neural leprosy of Leloir), a clinical picture may be observed which is quite analo-

gous to syringomyelia, namely, muscular atrophy of the Aran-Duchenne type (which, it may be said, in passing, no longer refers to a single pathogenic cause, being sometimes the result of a neuritis), sensory defects, trophic changes, frequently with mutilations,—all symptoms analogous to those of syringomyelia. The diagnosis is made from the idea of the existence of leprosy and the fact that tactile sensibility is almost always altered along with the other forms. In rare cases (like that of Rosenbach), where there is preservation of tactile and loss of thermal and painful sensation, neural leprosy may still be recognized by the following signs: The zones of anæsthesia and of thermal anæsthesia are irregularly distributed in the form of patches, and the transition from the anæsthetic to the normal areas is abrupt. This is absolutely contrary to what is found in syringomyelia, where the partial anæsthesia occupies large areas. The etiology of the affection is still obscure, but, considering the nature of the process, which is neoplastic, the frequency of its development in youth and the slowness of its evolution, it is quite probable that we have a medullary lesion having as its point of departure an anomalous development of the elements constituting the central gray matter of the cord.

The merit of Van Gieson's paper, ²² a Cartwright prize essay, consists in its thorough report upon the microscopical findings in a cord given him for examination by Delafield, in whose service the patient was treated. The diagnosis of syringomyelia was not made during life, and, unfortunately, the history of the case is incomplete respecting certain details of examination, particularly concerning the character of the sensory disturbances. A male aged 47 was in good health twenty-one months before death, excepting one attack of acute rheumatism (?) in the hands. The first symptoms were soreness at the epigastrium, and numbness, first in the right, later in the left foot and leg; nine months later, a girdle sensation with numbness from the waist downward, and difficulty in walking far on account of the motor and sensory disturbances in the legs. The sphincters were normal. During the twelfth month temporary incontinence of urine occurred. The patellar reflexes were variable, usually exaggerated. The plantar reflexes were diminished, the diaphragmatic and cremasteric reflexes absent. Ankle-clonus and spastic rigidity were absent. Sensation above the umbilicus

remained normal, but was diminished in the legs. (There is no statement as to the character of the sensory disturbances.)

Œdema of the extremities and incontinence of urine were progressive. Temporary improvement in several symptoms was a feature of its course. Pain in the feet and in the umbilical and hypogastric regions occurred a month or two before death. A fusiform enlargement of the spinal cord was found, caused by a reddish-gray tumor filling up a large part of its transverse diameter as a solid plug. Within it was a central tubular cavity.

About sixty small nodules projected from the surface of the cord in its lower portion, chiefly along the posterior roots. Van Gieson's anatomical diagnosis is "a telangiectatic glio-sarcoma occluding the middle portion of a tubular cavity in the cord, lined with neuroglia tissue, which, in places, is in a condition of hyperplasia." Above this tumor the posterior median, the direct cerebellar column, and the antero-lateral ascending columns of Gowers are degenerated; below the tumor there is a degeneration of the posterior tracts. The uppermost portion of the cavity is lined by a thin membrane of neuroglial tissue, smaller branching neuroglia cells and small spheroidal and oval cells, lying in a network of fibres which unites with the surrounding neuroglia in a more or less distinct line of demarcation. This limiting membrane also lines the tubular cavity in the lower third of the tumor. The central canal of the cord in most of its extent is normal. A tumor expanding in the cord so extensively as this one would be liable, by interfering with the circulation, to cause the œdema found in its vicinity and in the cord above the tumor. Concerning the pathology, he says: "The absence of morphological or clinical evidence of the formation of the cavity by the tumor, and the intramural situation of the lower third of the tumor, which is but slightly degenerated, indicate that the cavity was formed previous to the development of the tumor from the cavity-wall. The cavity probably is a congenital defect, but as there are in places neuroglial hyperplasias of its wall, with evidence of degeneration, the cavity has probably been modified to some extent by the growth and disintegration of gliomatous tissue along its wall. In the places where the hyperplasia of the wall is greatest the lumen of the cavity is the smallest, and where the cavity is largest its walls are the thinnest. To what extent the cavity is congenital in its

origin, and to what extent it has been enlarged by the growth and degeneration of gliomatous tissue surrounding the cavity, is difficult to determine. On account of the accommodation of the structure of the cord to the configuration of the cavity, in the developing and adult stages, no symptoms occurred until twenty months before death, when the tumor began to grow from the cavity-wall. It is fully in accordance with Cohnheim's theory that tumors should be associated with these cavities, starting in a faulty development of the cord, and that, furthermore, they would be liable to arise from the wall of the cavity; for, preferably in the wall of such a congenital defect, we would expect the presence of residual epiplastic tissue or of an included portion of some other inappropriate embryonic layer, from either of which a tumor might arise, a neuroglial hyperplasia in the former, a heterologous tumor in the latter case. The liquefactive degeneration of the glia-cells in this case is interesting in connection with the breaking-down process characteristic of gliomatous tumors and certain gliomatous hyperplasias occurring in syringomyelia. The changed glia-cells are so uniformly and extensively present in the hyperplastic portion of the wall as to suggest that the disintegration and disappearance of the gliomatous tissues in syringomyelia may be, in a measure, due to such a liquefactive degeneration of the glia-cells.

Chéron,¹⁷ writing on the pathology of syringomyelia, quotes Grasset's statement that syringomyelia is not a disease in the nosological sense of the term, but a particular anatomical state, the culmination of one or more anatomico-pathological processes. Chéron makes the following division: 1. Dilatation of the central canal, or hydromyelia. 2. Excavating myelitis (*myélite-cavitaire* of Joffroy and Charcot). 3. Peri-ependymal sclerosis (*la sclerose péri-épendymaire* of Hallopeau). 4. Gliomatosis of the cord.

Schmitt and Baraban,¹⁸⁴ report, at great length, a case of syringomyelia with autopsy, in which the diagnosis of tabes, chronic diffuse myelitis, spastic paralysis, and lateral amyotrophic sclerosis was made at different times by eminent authorities, though the correct anatomical diagnosis of syringomyelia was not made until after death.

Chiari,⁴⁰⁵ on reviewing the literature, found 74 autopsies described with sufficient detail to enable him to analyze them. Of these, in 45 the cavity was, in all probability, in communication

with the central canal, whether due (1) to defective development of the canal or to its mere subdivision, or (2) whether resulting directly from simple dilatation. Belonging to the first category were 29 cases; to the second, 66; of cavities formed by destruction of gliomatous tissue, 21; from myelitis and hæmorrhage, 6; from simple regressive disintegration of tissue, 2. He concludes that, in the great majority of cases, the cavity communicates in some way with the central canal. He thinks that to all cases of the first and second categories the term "hydromyelia" should be applied, restricting the term "syringomyelia" to those cavities which have no communication with the central canal. He calls the case reported in his paper, "chronic internal hydromyelia," the result of neuroglial proliferation around the central canal.

Lemoine,⁵⁵_{Mar. 25} gives an excellent review of its symptomatology and pathology.

Kronthal,⁷⁵_{Nov. 1} in discussing the pathology of cavity-formations in the cord, refers to Leyden's view, that syringomyelia is always a congenital defect, and to Cohnheim's theory of the origin of tumors connected therewith. Many opponents to these theories believe that the cavities are the result of disintegrative processes in morbid tissues. Hallopeau, Schule, Eichhorst, and others hold that the disintegrated tissue is the result of chronic inflammatory processes; Grimm, Westphal, Simon Reisinger, Krauss, Fürstner, Zacher, Roth, Schultze, and others believe that in their cases the cavities were the result of the breaking down of gliomatous tissue. Another theory is that of Langerhaus, according to whom intracranial tumors in the basilar region produce cavities in the cord by effecting stasis. Joffroy and Achard think that thrombosis or occlusion of vessels may be the cause of cavities. Schultze says that on this theory we ought to find cavities in cases of multiple sclerosis. Kronthal's view is, that a tumor in the osseous canal of the vertebral column produces stasis in the cord. As a result there is dilatation of the central canal; a further result dependent also upon the consequent impairment of nutrition is the growth of gliomatous tissue. This gliomatous formation may be both circumscribed and diffuse. If circumscribed, it must break down when it has reached a certain size, for the mass can no longer be nourished centrally. Atrophic syringomyelia occurs only in the gray matter. It is the latest stage of an inflammation and subsequent contraction

of the tissues. When stasis permits the growth of the gliomatous tissue, compression of the medullary substance must result; if circumscribed, cavities will result. The central canal may be dilated. Many observers who have described compression of the cord from tumors represent ascending and descending secondary degeneration, and, in addition, degeneration in those tracts above the lesion which do not belong to the ascending system, and below the lesions in those not belonging to the descending tracts.

Kiewlicz³⁶⁸ has reported a complicated case with autopsy, in which a male, aged 22, developed pain and stiffness in the neck after a fall, and three months later paraplegia with paresis of the sphincters, swelling, and loss of sensibility in the right leg, with exaggerated knee-jerks; still later, contracture in the legs and extension of the anæsthesia to above the umbilicus. Microscopical examination showed evidences of a transverse myelitis, in which hyaline degeneration of the vessels with obliteration was a prominent feature. A cavity was found in the dorsal region representing, according to the author, true gliomatous syringomyelia. In addition, there were numerous focal lesions of the multiple-sclerosis type in the left cerebral hemisphere, pons, medulla, and cord. There were also secondary degenerations resulting from the other lesions. The author considers that as a result of the trauma syringomyelia developed, transverse myelitis following, and subsequently multiple sclerosis. The case is suggestive as regards the time required for the formation of cavities in the cord, and the relations between traumatic myelitis and the processes producing gliomata and multiple sclerosis. It is difficult to understand how the author is able to exclude the view that the gliomatous process commenced before the injury occurred.

In a discussion³ between Joffroy and Déjérine upon 2 cases of muscular atrophy without sensory impairment, reported by the former as excavating myelitis (*myélite cavitaire*), Déjérine would not accept the diagnosis of syringomyelia, regarding them as cases of chronic poliomyelitis, the sensory impairment characteristic of syringomyelia being absent. While admitting with Joffroy that a gliomatous process might fail to produce sensory symptoms during a part of its development, he denied the possibility of its producing decided muscular atrophy without at the same time involving sensory functions. "There is not," he says, "a single observation

of syringomyelia with autopsy in which muscular atrophy has not been accompanied by sensory disturbances."

Rumpf⁷⁶ reports a case of syringomyelia without autopsy, which he has made the basis of a plan of examination of the sensibility. The importance of more thorough methods in this particular, since a partial anæsthesia has become so valuable a diagnostic factor, warrants a description of a part of his paper.

Motility was examined by means of the faradic and the galvanic currents. Sensibility was tested (1) for simple contact by touching the skin with a needle or the fingers; (2) for differentiation between two simultaneous impressions was tested with the common æsthesiometer; (3) for differentiation between successive impressions. He first determined this by bringing in contact with the skin a toothed wheel transmitting a faradic or galvanic current. An improvement upon this method was the use of Hering's æsthesiometer, which consists of twelve cylindrical metal rods, one of which is smooth, the others being wound with wire of different sizes from 0.11 to 1 millimetre ($\frac{1}{20}$ to $\frac{3}{10}$ inch). When moved over the part at a surface rate and pressure, the sensation of roughness is experienced unless the interval is too brief for perception. Another method consists in the use of tuning-forks vibrated on the skin. He used fourteen, which ranged as follows: 13, 35, 66, 92, 122, 180, 246, 300, 375, 480, 560, 660, 800, 1000. From his normal table the following have been selected: Perception on forehead, 122 vibrations; neck, 480; scapular region, 180 to 570; pectoral region, 480 to 800; back, 300 to 800; abdomen, 122 to 570; arm, flexor surface, 180 to 570; arm, extensive surface, 92 to 570; forearm, extensive surface, 480 to 660; palm, surface and finger-tips, 660 to 1000; dorsum of hand, 660 to 800; thigh, anterior surface, 246 to 660; posterior surface, 92 to 480; calf, 92 to 480; dorsum of foot, 180 to 800; foot-sole, 570 to 800. Still another method, said to be the best of all, is that of writing letters and figures upon the skin with a hard, pointed instrument. Figures 1 centimetre ($\frac{3}{8}$ inch) high are appreciated on the forehead, cheeks, neck, palm of hand; 2.5 centimetres ($\frac{3}{4}$ inch) high over biceps, flexor surface of forearm, back of hand, and over scapula; 2 centimetres ($\frac{1}{2}$ inch) high, dorsum of forearm and about nipples; 2.5 centimetres (1 inch) high over triceps, on back; 3 centimetres ($1\frac{1}{2}$ inches) on calf and foot-sole; the finger-tips appreciation figures

0.5 centimetre ($\frac{1}{2}$ inch) high. Furthermore, tests were made for the sensation of tickling and also for analgesia in the usual manner, and by faradic excitation, the resistance of the tissues being tested by the galvanic current to allow for variations in current strength due to variation in results.

In the testing of acuteness of sensibility to heat and cold, he first determined whether an object is appreciated as warm or cold. Then determining the differentiation between different degrees of heat, cubical copper vessels, 7.5 centimetres (3 inches) square on the bottom, were filled with hot water or ice-water, in which a thermometer is immersed. Before obtaining these he used test-tubes filled with olive-oil; much more time is required with them, glass being a poor thermal conductor. Temperatures of from 27° to 30° C. (80.6° to 86° F.) are considered by some as indifferent, by others as warm, and 25° to 27° C. (77° to 80.6° F.) as indifferent or cool; at about 24° C. (75.2° F.) sensation of cold begins. The same copper vessels were used to obtain differences in temperature by quickly placing them, one after the other, on the skin, or placing two at the same time on the symmetrical parts of the body. The finest differences occur between 27° and 33° C. (80.6° and 91.4° F.), differences of 0.2° to 0.1° C. (0.36° to 0.18° F.) being appreciated from 33° C. (91.4° F.) upward, appreciable because less acute, at 40° C. (104° F.) being 0.4 to 0.5° C. (0.72° to 0.9° F.). From 33° C. (91.4° F.) downward it also becomes less, though at 3° C. (5.4° F.) a difference of 1.5° C. (2.7° F.) is still appreciable. Nothnagel found the varieties in sensibility on different parts of the body to be, for the forehead, 0.6° C. (1.08° F.); thorax, 0.4° C. (0.72° F.); abdomen, 0.4° to 0.6° C. (0.72° to 1.08° F.); back, 1.2° C. (2.16° F.); palm of hand, 0.5° to 0.4° C. (0.9° to 0.72° F.); back of hand, 0.3° C. (0.54° F.); back of foot, 0.5° to 0.4° C. (0.9° to 0.72° F.); calf, 0.6° C. (1.08° F.); thigh, 0.5° C. (0.9° F.); cheeks, 0.4° to 0.2° C. (0.72° to 0.36° F.); temporal region, 0.4° to 0.3° (0.72° to 0.54° F.). Rumpf's figures were somewhat under those given. In his patient differences of 8° to 10° C. (14.4° to 18° F.) were not appreciated. The sensation of position and attitude of members was tested in the usual manner by active and passive movements of the parts while the patient's eyes are closed.

Charcot, in a clinical lecture reported by Blocq,¹⁴ calls attention to the possibility of mistaking hysteria for syringomyelia,

The character and sensory disturbance of the latter, namely, loss of sensibility to pain and thermal changes, with preservation of tactile sensibility, is a form found in hysteria, and may also be induced by suggestion. He relates a case, however, in which "this great simulator of organic diseases" imitated syringomyelia in a still more remarkable manner than by sensory features alone. He exhibited a patient presenting loss of motility in the thumb and fingers of one hand, an œdematous tumefaction of the dorsum of the hand, loss of the pain and temperature sense of the hand, with the lower fifth of the forearm, with normal tactile sensibility. The history of the case showed that on a previous occasion he had a similar attack (except that then tactile sensibility was also impaired), which ended so abruptly that he remarked: "If I had been at Lourdes I would have considered it a miracle." The duration of the first attack was about a year. After an interval of months the trouble returned suddenly. "Evidently," he says, "a case of hysteria in the male, and not syringomyelia." Speaking of the pathological anatomy of syringomyelia, and particularly in defense of Joffroy, he says: "Some have maintained that excavating myelitis (*myélite-cavitaire*) belongs to the gliomatous formations, I am satisfied to remark that the authors who have described these forms of myelitis are experts in pathological spinal anatomy. They know perfectly what gliomatous neoplasms are, and they know how to distinguish the lesions of myelitis."

Remak,⁴ reports as syringomyelia a case, without autopsy, in which, besides slight bulbar symptoms, there were degenerative atrophy of the left hand, slight spastic paresis of the left leg, and the characteristic partial sensory impairment (loss of temperature- and pain- sense, with preservation of tactile sensibility) of syringomyelia. There was also painless œdema, limited to the upper extremity, beginning quite abruptly in the left hand, and after eight or ten days invading the right, resembling a subcutaneous swelling rather than an œdema of the true skin, and without a history of thrombosis, cardiac defects, or renal disease. The article contains an interesting analysis of several symptoms. The author found that perception of heat was more extensively and profoundly affected than perception of cold, and their respective areas did not correspond. This is confirmatory of Goldscheider's theory that we have skin-areas in which nerve-endings sensitive

to high degrees of temperature predominate (heat-sense), and others sensitive to low temperature (cold-sense). Charcot also called attention,¹⁴ in one of Debove's patients, to this non-conformity in the areas of impaired perception of heat and cold.

Upson,¹ makes the diagnosis of syringomyelia in a case without autopsy, in which the patient fell 13 feet, striking on his back, and was laid up for three weeks, with what symptoms is not stated, but six months previous to the fall he had noticed a tired feeling in the legs and some pain in the lumbar region; six months after the injury the legs again became weak, chiefly the right leg; painful twitching occurred in the entire limb, also pricking and burning sensations in the legs and pain in the back; some retention of urine and constipation. On examination of the upper extremities, the motor, sensory, and reflex functions were found normal. In the lower extremities there was loss of power, especially in the flexors of the legs and feet, the left quadriceps extensor being also weak. The left thigh measured $1\frac{1}{4}$ inches (29 millimetres) less than the right. This the author regards as an atrophy, but against this is the fact that the electrical reactions were normal. The knee-jerk was absent on the left and weak on the right side. There was muscular twitching of the fibrillary and coarser kinds, but no ankle-clonus. Tactile sensibility was slightly diminished in the lower limbs; pinching was painful, though not acutely so. Sensation to heat and cold was much blunted, especially over the right side and buttock, and here pinching was not painful. To produce this combination of thermal anæsthesia, analgesia, and only slight tactile anæsthesia, with atrophic paralysis, the author considers a lesion in the central portion of the cord necessary, and attributes it to a glioma. He admits that the case is atypical, in that the disease affects the lumbar instead of the cervical portion of the cord, its usual starting-point, but maintains that cases of its occurrence lower down are not unknown.

This condition is so rare that Lemoine⁵⁵ says atrophy of one of the lower extremities alone never occurs, and in one case only (Lenhosseks) have both lower extremities shown atrophy when the upper extremities were intact. In view of this statement and the fact that tactile sensibility was also impaired to some extent, another rare condition in gliomatous syringomyelia, would not myelitis, a result of the injury, be a more tenable hypothesis than gliomatosis?

Church¹³⁹ gives a doubtful example of syringomyelia, the case of a male aged 64, who had shown some mental failure, was visionary, forgetful, and irascible, and who developed complete abolition of thermic sensation below the lumbar region, associated with analgesia of slightly greater surface extent; but he adds—and this fact is hardly constant with the partial anæsthesia of syringomyelia—the points of the æsthesiometer could not be recognized at nearly normal distances on every part of the skin surface, though the forms of bodies were appreciated. There was retardation in the transmission of tactile sensations. The reflexes, electrical reaction, and muscular sense were normal; paralysis, atrophy, and contractions were absent.

Hartley¹ presented a man before the New York Surgical Society whose symptoms he thought were best explained by supposing they were the result of syringomyelia. There had been a slowly-progressive deformity of the hands and loss of some of the phalanges by ulceration, with but little pain. In scattered parts of the areas of distribution of the median and ulnar nerves of the hand and arm there had been loss of pain, temperature, and tactile sensibility; vasomotor changes had also been frequent; syphilis, leprosy, and tuberculosis had been excluded. I think this disease resembles Morvan's disease rather than syringomyelia.

Syphiloma of the Cord.—Osler²⁴² reports a case of syphiloma of the cord and cauda equina. Death from diffuse central myelitis. Clinical summary: Chronic alcoholism; history of syphilis. For nine months pains in the legs, particularly in the left, which wasted rapidly and presented vasomotor changes. Pains in the arms, especially the right; no wasting, and, on admission, arms of equal strength. About two months before death loss of control of bladder and rectum. Within the last month of life loss of power in the right arm, with pains; partial loss of power in the left arm, with marked inco-ordination; complete paralysis of the left leg; gradual loss of power in the right. Development of bed-sores. Arthritis in knees or ankles. Toward the close of life high fever, with delirium. Anatomical summary: Gumma in antero-lateral columns of cervical cord, opposite the right fourth anterior nerve-root. Gummata involving the third, fourth, and fifth anterior sacral nerve-roots, and the second and third posterior sacral roots on the left side. Ascending degeneration of the left posterior

median column. Central myelitis. Partial atrophy of the sciatic nerves.

Hydatids.—Marwood²⁶⁷ reports a case of paraplegia from compression of the cauda equina by hydatids within the membranes, the cord itself showing no signs of pressure.

Compression of the Cauda Equina.—Thorburn⁹⁰ reports a case of supposed tumor of the cauda equina. During the first stage (for five or six years) there was paralysis of the fourth sacral root, which supplies the bladder and rectum, and irritation, causing pain in the sensory branches of the first three sacral roots. In the second stage (eight months preceding admission) there was loss in the power of coitus, due to paralysis of muscles supplied by the third sacral root, and anæsthesia in the previously painful areas, the irritation spreading to the third and fourth lumbar roots. In the third stage (five months later) the nervi erigentes were paralyzed, indicating pressure on the second sacral roots. Anæsthesia was well marked in the cutaneous distribution of all the sacral roots, less obvious in the fifth, pain being confined to the third lumbar roots. Motor weakness affected most of these roots. The first two lumbar roots entirely escaped. The slow course of the disease excludes, he thinks, a lesion of the cord or a meningitis; hence, he would locate a tumor between the upper border of the second and the lower border of the third lumbar vertebræ to explain the phenomena.

Tooth's Gulstonian lectures on secondary degenerations of the spinal cord² are a valuable contribution, worthy of careful study.

MYELITIS.

Peri-ependymal Myelitis.—Drummond⁶ reports a case, with autopsy, death having resulted from acute peritonitis due to abscess on the bladder-wall. There was loss of mobility and sensibility below the umbilicus, preserved reflexes, and retention of urine. A microscopical examination of the cord showed that the canal was patent in the middle and lower parts of the lumbar enlargement, and the columnar lining was well shown; but, as the conus medullaris was approached, the lumen was no longer to be seen, and its site was occupied by a nucleated reticular tissue, which stretched out at each side in concentric laminæ. All through the lumbar enlargement the gray matter surrounding the cord was crowded

with nuclei, which were particularly numerous in the posterior gray commissure. Throughout the cord the appearance of the minute arteries strongly suggested syphilitic arteritis. The cells in the gray horns were normal, and there were no changes in the white columns worth naming, beyond excessive nucleation. He considers the lesion syphilitic.

Acute Myelitis.—Hertter's²⁴² article, "A Study of Experimental Myelitis," has the twofold object, first, to show that it is possible to give rise to an acute localized myelitis in animals by shutting off, temporarily, the blood-supply of the cord; secondly, to describe the histological characters resulting. A modification of the Stenson operation was employed upon rabbits. His conclusions differ from Spronck's, in his having found degeneration in the posterior roots.

Tison²⁴ Dec. 22, '96 reports a case of acute myelitis, with autopsy, in which traumatism and the absinthe habit are given etiologically as factors.

Steiger¹⁵⁰ Mar. also reports a fatal case of acute traumatic myelitis, probably primarily hæmorrhagic. A medico-legal reference suit respecting a case of acute myelitis after an assault, in which Bamberger and Hoffmann were referees, is reported. July 4.

POLIOMYELITIS.

Bramwell⁷⁶⁶ Nov. 1 records a case in which acute anterior poliomyelitis appears to have developed when the child was 3 weeks old. He points out how rare it is to find the disease developing at such an early age.

Sachs¹²³⁹ reports a case in which nuclear ophthalmoplegia was associated with poliomyelitis. Ptosis of the right eye gradually developed, followed after a few months by ptosis of the left eye, and soon after by paresis of all the external ocular muscles of both eyes. There was immobility of the left pupil to light, but not to accommodation. The left eye had a corneal opacity which prevented testing. During the development of the ocular paresis subacute poliomyelitis involved the entire right leg; atrophy followed. The knee-jerks were abolished; there were no sensory disturbances; no tabetic symptoms. Seeligmüller's case is the only similar observation on record, though the relations between the two forms had been suspected by Hutchinson, Mautner, and others.

Acute Ascending Paralysis (Landry's).—Bremer¹⁰⁰ July reports a

case under this title which he summarizes as follows: A prodromal state of muscular weakness manifested principally in the legs, and lasting about six weeks; vomiting; nocturnal incontinence of urine; then rapidly developing motor paralysis of both legs, involving, at first slightly, afterward completely, the upper extremities and the muscles of the trunk. Increased knee-jerk and the presence of the foot-clonus in the beginning, abolishment of both later on; transitory diplopia; intactness of sensation; absence of pain, fever, atrophy, and discomfort; gradual but complete recovery in the course of about two months.

AMYOTROPHIC LATERAL SCLEROSIS.

Dornblüth,⁷⁶ cites the case of a female aged 58 years, with an hereditary psychopathic history, after suffering for four years with "circular insanity," suddenly developed paralysis of the right extremities; after two years contractures developed in both legs; then followed elevations of temperature of brief duration, pupillary rigidity, general atrophy, and two years later contractures of both arms, decubitus, and death. The autopsy revealed the lesions of amyotrophic lateral sclerosis; degeneration of the pyramidal tracts from the lumbar region to the quadrigeminal region; degeneration of the motor ganglion-cells of the cord, least marked in the lumbar enlargement; also atrophy of the hypoglossal nucleus, and those of the vagus (anterior), the glossopharyngeal (anterior), the facial, and the fifth (motor); also hyperæmia and fresh hæmorrhage in the pons and medulla, and old hæmorrhage before the facial knee, with secondary ascending degeneration in the posterior longitudinal fasciculus.

POSTERIOR SPINAL SCLEROSIS.

Among the papers on this disease may be mentioned the following: Gray,¹_{Nov. 16} "On the Curability of Locomotor Ataxia," containing an account of the pathology and a review of published cases in which cures have been claimed. From the conservative conclusions reached the title might properly have been termed "the incurability of locomotor ataxia." Neftel,²⁰_{Aug.} "On the Etiology and Therapy of Tabes." Walton,⁹⁹_{Aug. 1} "On the Latency of Ataxic Symptoms in Cases of Optic-Nerve Atrophy." His data are corroborative of Gower's view in favor of latency in these cases.

Schwarz,²¹ "On Syphilis and Tabes." In 30 cases he was unable to find one without a history of antecedent syphilis. Minor,²⁴ "On the Etiology of Tabes." He favors the view that syphilis is the chief etiological factor.

Oppenheim⁴ reports a case of syphilitic disease of the central nervous system resembling tabes. Clinically, the autopsy revealed a gummatous arachnitis, with chronic internal pachymeningitis, periarteritis, and endarteritis; also, various nuclear and neural atrophies in the cord and medulla. He concludes that syphilitic pseudo-tabes may closely simulate true tabes, and that it demands thorough antisiphilitic treatment, which produces excellent results.

Germeix²⁴³ reports cases of tabes of rapid course treated early by large doses of mercury (inunctions) and potassium iodide, with persistent and complete cures; 4 cases are cited. He believes in their syphilitic origin.

Charcot⁵⁵ gave a lecture on gastric crises with black vomit occurring in tabetics.

Girode¹⁵² relates the case of a man of 50, in the paralytic and atrophic stage of tabes, whose gastro-intestinal crises were accompanied or ushered in by profuse sialorrhœa, beginning suddenly, often at night, and nearly choking the patient. Six to eight hundred grammes (19 ounces to 25 ounces) of saliva have been collected in a few hours; gastric crises would follow, then intestinal crises, sometimes accompanied by genito-urinary symptoms, the attacks lasting from three to twelve days.

Handford⁴⁷ describes a case of locomotor ataxia of at least 5 years' duration, with laryngeal crises and arthropathies terminating in general paralysis of the insane. He remarks that the occurrence of well-marked locomotor ataxia in the middle or toward the latter part of a case of general paralysis cannot be said to be altogether infrequent; but it is far from common for general paralysis to supervene upon a typical case of locomotor ataxia of several years' standing.

Barié³ calls attention to the association of exophthalmic goitre with tabes, and believes that it is more than a mere coincidence and due to bulbar disturbances, possibly from congestive hyperæmia. Joffroy considers them distinct affections associated, but admits that tabes may be complicated with tachycardia and a

degree of protrusion of the eyeballs resembling certain forms of Basedow's disease.

Chataigner,¹²⁴⁰ writing upon auditory troubles in tabes, describes variable disturbances, from slight hardness of hearing up to total deafness. He considers them dependent on labyrinthine hyperæmia, which is produced by a direct irritation of the acoustic nerve or by an indirect effect through other nerves, whose vaso-motor influence upon the vessels of the ear have long been known.

Trousseau,¹⁷ in an article entitled "The Tabetic Eye," mentions optic-nerve atrophy, paralytic affection of the ocular muscles, pupillary phenomena, diminution of intra-ocular tension during the paralytic period, ophthalmic migraine with its scotomata and hemiopia, and periorbicular anæsthesia.

Angel Money,⁶ has observed dilatation of the pupil in cases of tabes in which the pupil did not contract to light when an intense light was used. He suspects that it is due to the intense heat and light acting upon the conjunctival branches of the fifth, producing dilatation in the same manner that pinching or faridization does.

THE MUSCULAR ATROPHY OF ATAXICS.

Dejérine,⁹² publishes a long article on this subject, based on 19 cases of tabetic atrophy, in 9 of which there had been an autopsy made, with a histological examination. He draws the following conclusions: 1. The muscular atrophy which frequently develops in the course of tabes (20.1 per cent. of his cases) is not an affection arising independently and adding itself to the symptoms of this disease, but is an integral part of its symptomatology. 2. This atrophy occurs generally at an advanced period of tabes, and is oftenest symmetrical. Its evolution is slow. 3. It commences nearly always in the muscles of the extremities (foot, hand), and a little oftener in the lower than in the upper limbs. 4. This predominance of the atrophy in the muscles of the extremities, whatever may be the degree of diffusion attained by it finally, is the rule, and the contrary the great exception. 5. In the lower limbs the atrophy exhibits itself in the form of talipes equinus, with plantar flexion of the toes, especially the great toe. In the upper limbs it takes the form of the Aran-Duchenne type, very rarely the scapulo-

humeral or antibrachial type. 6. The type Aran-Duchenne depends solely on muscular atrophy. The deformity of the foot and toes depends, in its commencement, on the same pathogeny; but later there are aponeurotic and muscular contractions which hold the foot and toes in their faulty position. 7. Tabetic muscular atrophy develops without fibrillar contractions. The power of voluntary muscular contraction is diminished or abolished. The faradic and galvanic contractility is modified quantitatively, but the reaction of degeneration is not common. 8. This muscular atrophy depends on an alteration of the motor nerves, which diminishes progressively from the periphery to the centre, and a trace of which may, in some cases, extend even up to the anterior roots. The alteration is purely peripheral in nature, the motor cells and the gray matter of the anterior horns being intact. 9. The radiation from periphery to the centre (so common in other forms of peripheral neuritis) agrees perfectly with the symptomatology of tabetic muscular atrophy, as the author has described it in the course of this article. 10. The pathogeny of the peripheral neuritis on which the muscular atrophy of ataxics depends is still undetermined. We know that it is not the same as the neuritis of the sensory nerves met with in these patients. Less frequent in the course of tabes than the latter, the motor neuritis ought henceforth to be regarded as pertaining also to the malady of Duchenne, the symptoms of which it can singularly modify in certain cases.

Suckling²_{Nov. 3} reports a case of tabes with muscular atrophy in the hands and feet. He adopts Dejérine's view that the atrophy is due to a peripheral neuritis.

Theim⁶_{Nov. 16} suggests partially anæsthetizing patients suspected of having tabes, to bring out the ataxic gait.

Cagney²_{Nov. 16} reports cases of tabes benefited by the faradic brush.

Cazenave de la Roche²⁷⁰_{May} advocates the application of the cautery to the lower extremity, instead of over the spine, for tabes.

Benedikt⁵⁷_{Nov. 2} reports 2 cases of tabes favorably treated by "bloody nerve-stretching," which he prefers to the bloodless method.

Prince,¹²³⁹_{July 16}⁹ in a paper on "Malaria as a Cause of Degenerative Disease of the Spinal Cord," reports 9 cases of disseminated, lateral, and posterior spinal sclerosis associated with a malarial history.

THE REFLEXES.

This subject in general is well reviewed by Sharkey,⁶ in a paper on the "Diagnostic Value of the Reflexes," and by Lubbock,²² in an article on "The Reflexes;" also by Ziehen.⁴⁰⁶ Certain qualitative variations in the knee-jerk are described by Benedikt,⁷⁵:

1. The clonic form, in which several rapidly-successive jerks follow on blow upon the tendon, seen in myelitic and cerebral forms of paralysis and in spastic conditions.
2. The paradoxical form, in which flexion instead of extension follows percussion. Sometimes there is first an extension jerk followed by a flexion jerk.
3. The irradiating knee-jerk, in which, accompanying or following the knee-jerk, there is a transfer of the phenomena to the opposite side, with tremors of the trunk.
4. The tonic form, with slow extension and tardy relaxation.

Le Gendre¹²² has an article on "The Importance of Examinations of the Tendon Reflex."

COMBINED SCLEROSIS.

Glynn¹⁸⁷ reports a case of ataxic paraplegia with autopsy. The patient exhibited certain ataxic and spastic symptoms, and the cord showed sclerosis of the posterior and lateral columns. The sclerosis, moreover, especially in the lumbar region, involved the posterior median columns rather than external root-zones. The case differed from the usual type in presenting other than ataxic and spastic troubles, and in the diffuse character of the sclerosis in certain parts of the cord. The exceptional symptoms were sensory troubles, which appeared early and were pronounced, as analgesia of the legs and lower part of the trunk; later, allochiria (perverted localization of sensory impressions); then anæsthesia, and, finally, loss of sensation in the upper extremities and trunk; besides there were girdle-pains and visceral crises. The spinal symptoms appeared at the age of 17, while ataxic paraplegia is a disease of middle life; its progress was more rapid than is usual in the latter affection. It resembled Friedreich's hereditary ataxia, in respect to the age of onset, the early implication of the upper extremities, the tremor of the hands on voluntary effort, the occurrence of vertigo, and the fact that a sister had had some spastic trouble. It differed from hereditary ataxia in presenting sensory troubles and in the absence of nystagmus, speech disturbances, and the

peculiar jerky oscillations of that disease. The lesions found were characteristic of hereditary ataxia in respect to the extensive sclerosis of the cervical cord and the implication of its root-zones; in other respects unlike it, for the sclerosis was intense in the lumbar cord, and did not involve the root-zones; the scleroses of the lateral columns were also more diffuse than is usual in hereditary ataxia. The only healthy portions of the upper part of the cord were the anterior columns and a narrow portion of the cerebellar tracts. The gray matter appeared normal.

Another somewhat incompletely reported case of ataxic paraplegia is reported by Du Cane,¹⁶_{July} and two others by Whitton, of New Zealand.²⁶⁷_{Apr.}

HEREDITARY ATAXIA (FRIEDREICH'S DISEASE.)

Ladame¹⁹⁷_{July} publishes an exhaustive paper on this subject, which, besides being an excellent review, contains a very complete bibliographical list, comprising nearly one hundred articles from the time of Friedreich's original paper in 1861 down to the present. New cases are reported by Suckling²_{Nov. 18} (3 in number), Hinshelwood⁶_{Sept. 28} (an isolated case without a family history of the disease, but otherwise typical), and Surmont,¹⁸¹_{July} who gives a family history in which, out of eighteen members of three generations, four died in infancy, and six out of the remaining twelve had Friedreich's disease. Clark⁶_{Mar. 28} reports 3 cases.

PERIPHERAL NERVOUS DISEASES, MUSCULAR DYSTROPHIES, AND GENERAL NEUROSES.

By HENRY HUN, M.D.,

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INJURIES TO NERVES.

EULENBURG⁷⁶ states that whereas formerly the police in arresting persons who offered resistance were accustomed to bind them about the upper arm, and thus compress the radial nerve and cause paralysis in its distribution, now such paralyzes are very rare, because in order to avoid them the police bind the cord about the forearm just above the wrist. That this latter method is not altogether free from danger when the cord used is small and the binding very tight is evidenced by the case of a man thus bound, who exhibited a paresis of motion and sensation in the distribution of the median nerve below the wrist. The prognosis in such cases is favorable, although the paresis may continue weeks and months. The treatment is an electrical one.

Port⁶ reports a case of paralysis of the recurrent laryngeal nerve after injury to the thorax. The wheel of a heavy car passed over the lower part of the chest of a man aged 25. No fracture or external injury could be detected. For several days he remained in a very low condition, complaining of violent pain in the left hypochondrium, with repeated vomiting; pulse 140. Effusion into the left pleural cavity could be detected on the third day, but was not considerable. The patient, who had only spoken in a whisper the first week, on regaining his strength remained hoarse. Examination by the laryngoscope showed that the left cord and arytenoid cartilage did not move at all on phonation, while the right cord moved freely, and even passed the middle line. Treatment by the interrupted current was persevered with during three months, and gradually brought back nearly the normal condition, the patient speaking with a fairly good voice; absorption of the pleural effusion also took place. In this case the pleural

effusion, which was very likely of a hæmorrhagic nature, was not so copious that the recurrent nerve could have been subjected to any pressure from it; but, probably in consequence of the severe injury, extensive parenchymatous hæmorrhage had taken place in the mediastinum, and the recurrent nerve was compressed by such a clot, which was subsequently absorbed.

Hughlings-Jackson ⁶_{Dec. 22, 33} cites the case of a girl aged 12 years, who, probably in consequence of a fall on her back, presented a paralysis of the lower part of the left trapezius muscle, that part of the muscle mainly supplied by the spinal accessory nerve escaping. The paralyzed portion of the muscle did not respond to the faradic current. Another rare case is reported by Bernhardt. ⁴¹_{Mar. 21} A laborer aged 46 fell a distance of 9 feet, striking upon his outstretched right hand, in consequence of which fall there developed an atrophy and paralysis of the right supra- and infra- spinatus muscles. These muscles responded feebly to the direct but not at all to the indirect electrical excitation. All the other muscles about the shoulder and in the arm were intact, so that the case is an example of the rare condition of an isolated peripheral paralysis of a supra-scapular nerve.

Rieder ⁸⁴_{July 2} describes a case of injury to the ulnar nerve at the wrist, caused by the bite of a mad hog, and followed by a paralysis in the distribution of the nerve below the point of injury. Boucher ¹⁵²_{May 4} reports a case of traumatic paralysis of the left radial nerve, and Potts ¹¹²_{July} gives three unusual and interesting cases of paralysis due to pressure on a peripheral nerve.

Regeneration of and Operations upon Nerves.—Vanlair, ²⁰⁸_{Jan.} in a paper on the persistence of the regenerative power of nerves after repeated section, comes to the following conclusions: "It is not impossible to obtain experimentally, many times in succession, the reproduction of the same nerve. Barring accidents, the only obstacle is the endoneural thickening of the peripheral segment, due to the excessive hyperplasia of the sheaths of Schwann. But even this obstacle is easily obviated by centrifugal pressure of the nerve-fibres. It is otherwise compensated, and this at the time of the second reproduction, by the considerable increase of the proliferating power. As to the regenerative aptitude of nerve, it is virtually inexhaustible. It may even be said that its activity augments in the same degree that it is submitted to new proofs.

The nerves possess, in other words, the faculty of reproducing themselves indefinitely, in the same degree as connective or osseous tissue. They can always repair their losses of substance when they find before them a suitable conductor. There is here a permanent force, which the experimenter can dispose of at his pleasure, and which, well directed, will produce uniformly the same effects, with the precision of a locomotive guided by an experienced engineer. The regeneration of nerves is, then, regulated by two conditions: on the one side, a blind force always ready to intervene; on the other, the mechanical influences which, according as they exert themselves in one sense or in another, sometimes bring about the accomplishment of a reparative work, and sometimes render it fruitless."

Robson⁶ showed, before the Clinical Society of London, a girl aged 14, on whom he had successfully grafted $2\frac{1}{4}$ inches (6.25 centimetres) of the posterior tibial nerve into a corresponding gap in the median nerve in the forearm. He also showed the tumor which had involved the median nerve and had necessitated its removal. After the removal of the tumor, and on the patient recovering from the anæsthetic, the parts of the hand supplied by the median nerve were found to be devoid of sensation. Forty-eight hours after the removal of the tumor, $2\frac{1}{4}$ inches (6.25 centimetres) of the posterior tibial nerve were taken from a patient whose thigh was being amputated, and were inserted in the gap of the median nerve, to which it was attached by fine catgut sutures passing through the entire thickness of the nerve. In the operation great care was taken to have no tension on the grafted nerve, $2\frac{1}{4}$ inches (6.25 centimetres) being employed to fill an interval of $2\frac{1}{4}$ inches (5.6 centimetres). Great care was taken in handling the nerve, and it was immediately transferred from the leg to the arm. Healing occurred by first intention. Thirty hours after the nerve had been grafted, sensation had so far returned to the parts supplied by the median nerve that the touch of a pencil could be localized. Day by day sensation became more distinct, until at the end of five weeks after the operation it was so perfect that the slightest touch could be localized, and although there was manifest diminution in volume of the abductor flexor brevis pollicis it was not completely paralyzed.

McFarlane⁵⁰ reports a case in which the posterior tibial

artery and nerve and the tendo Achillis of the left leg had been cut with an axe. Two and a half years later (there being loss of sensation over plantar surface of foot, slight pressure on which caused ulceration) McFarlane cut down upon the nerve and found the two cords of it separated by at least $\frac{1}{2}$ an inch (1.25 centimetres), the upper end for upward of an inch (2.5 centimetres), the lower for $\frac{1}{2}$ an inch (1.25 centimetres), being much enlarged from fibrous thickening, which was situated principally in the neurilemma, and when the ends of the nerve were freshened the nerve proper, of a grayish-white color, could be seen in the centre. The freshened ends of the nerve were brought together by much traction, and united by five silk sutures. Two days later sensation began to return in the plantar surface of the foot, and from that time the foot improved in every way. Three months later the patient wrote that there had been no return of the previously very troublesome and numerous ulcerations, that there was good feeling in the foot, and that he could walk splendidly without crutch or stick. The case is remarkable for the length of time between the accident and the suturing of the nerves, viz., two years and six months, and for the rapidity with which sensation and motion returned.

Vander Veer ⁶¹_{Dec. 22} publishes an interesting clinical lecture, in which he describes in detail the methods of uniting cut nerves.

Puzey ²_{Aug. 10} reports an interesting case of steadily progressive muscular paralysis in the distribution of the right musculo-spiral nerve, with commencing reaction of degeneration following fracture of the humerus. In this case Puzey cut down upon the musculo-spiral nerve and freed it completely from the callus. A week after the operation improvement commenced, which went on to complete recovery. A similar case is reported by Mould ²_{Oct. 19} in a man who suffered from muscular paralysis and atrophy in the domain of the distribution of the ulnar nerve, following a severe injury to that nerve. Other therapeutic measures having failed, the nerve was cut down upon, freed from some inflammatory tissue surrounding it, and well stretched. The muscles were excited by electricity and the arm treated by douching and friction, and a rapid recovery took place.

Lesions of the Sacral and Lumbar Plexuses and of the Cauda Equina.—Mills, ²_{Jan. 12} cites a number of cases to show the importance and comparative frequency of lesions of the limb plexuses, and

gives a complete summary of all that is known in regard to these obscure affections. In the diagnosis of such cases the great value of close examination by the rectum cannot be overrated. Another important general point is the unilateral or bilateral character of these affections. They are commonly unilateral, or begin on one side, and in exceptional cases become bilateral. In some cases, however, of spontaneous neuritis or pressure neuritis or palsy, as in those reported by Imbert Goubèyre, the symptoms may be nearly uniformly bilateral. True lumbo-abdominal neuralgia is comparatively rare, and, therefore, in cases of lumbo-abdominal pain, whether joined with crural pain or not, careful search should be made for local lesions of the lumbar plexus, as aneurisms, abscesses, neuritis, etc. A close study of such a case will often reveal its true nature. Lumbo-abdominal neuralgia, as stated by Erb, is commonly associated with intercostal neuralgia. The presence of marked motor and anæsthetic disturbances with certain vesical, rectal, and sexual symptoms will help to decide against true neuralgia and in favor of lumbar plexus disease, if the affection is unilateral. Many of the cases of so-called lumbar, sacral, abdominal, lumbo-abdominal, and other forms of plexic neuralgias are in reality cases of neuritis of these plexuses.

Stevens⁵³_{Am. M.} reports an interesting case of glioma of the cauda equina.

NEURITIS.

Löwenfeld,³⁴_{Ann.} describes 2 cases of a peculiar trophic lesion which he calls the neurotic "flat-hand," following in the one case a neuritis of the ulnar nerve, in the other case a neuritis of both the ulnar and median nerves. This trophic disturbance consists in a hypertrophy of the subcutaneous connective tissue in the palm of the hand, the epidermis (which is not infrequently thickened in cases of lesions of the peripheral nerves) not being involved. In consequence of this, the normal depression in the palm of the hand is obliterated and the palm becomes flat. This trophic change was one of the early symptoms of the neuritis in both cases and disappeared very slowly in the course of months. Löwenfeld finds only 2 similar cases in medical literature, one reported by Weir-Mitchell, the other by Schieferdecker. Blocq⁴⁵²_{Ann. Fr.} reports several cases of muscular atrophy, paresis, and disturbances of sensibility in the hands, in the domain of the ulnar

nerve, and considers that these symptoms are probably due to a neuritis of the ulnar nerves, and Sharples¹¹²_{Sept.} reports a case of neuritis of the ulnar nerve due to a hypodermic injection of ether near the nerve-trunk. (Compare this with ANNUAL, 1889, vol. ii, B-1.)

Ruxton⁴⁷_{Jan.} publishes a case of neuritis of the median nerve consecutive to a cut of the wrist, in which the anæsthesia was limited to the palmar surface of the thumb, the radial half of the index and middle fingers, and to the radial half of the palm; and Rieder³⁴_{Mar. 19} gives a case of neuritis of the median nerve which presented, as somewhat unusual symptoms, muscular spasms and muscular hyperæsthesia, together with cutaneous anæsthesia dolorosa in the domain of the distribution of the nerve.

Stewart⁵³_{Jan. 25} reports a case of a syphilitic girl, aged 14 years, who was attacked with severe pain in the great toe of the left foot. The pain gradually extended up the leg to the knee. Antisymphilitic and other treatment having failed to relieve the agonizing pain, a portion of the sciatic nerve was removed, with immediate and permanent relief of pain. A year later she began to have pain in the little finger of her left hand, ascending during the following six weeks along the ulnar nerve to near the upper third of the forearm. The usual plans of treatment having proved ineffectual, the ulnar nerve was stretched and divided, with the result of immediate relief.

Leszynsky⁹_{July} narrates a case of severe neuritis of the brachial plexus terminating in recovery, and Sinkler⁷⁸⁰_{July 27} publishes an interesting clinical lecture on the subject of neuritis.

Coe¹_{Feb. 16} relates the case of a woman in whom ptosis and internal strabismus of the left eye appeared after taking quinine, 5 grains (0.3 gramme), four times a day during five days, and which disappeared rapidly after the administration of quinine was stopped. The same thing happened to the same patient once before while taking quinine.

Neuritis Plantaris or Erythromelalgia.—Morgan⁶_{Jan.} describes in detail 2 cases of erythromelalgia and the principal symptoms of 3 other cases which he has observed. The burning pain and tenderness was limited to the inner side of the soles of the feet in each case, was associated with a passive congestion of the parts, and was severe. The disease followed in the one case an attack of gonorrhœa, in the other an attack of rheumatism. After many forms of

treatment had been tried in vain, a cure was effected in one case by systematic hypodermic injections of morphia on the soles of the feet twice daily. Morgan considers that the paroxysms of pain in these cases are due to a perineuritis dependent upon a cachectic taint, while the vasomotor phenomena are due to a reflex irritation starting from the affected nerves and transmitted to those vasomotor centres in the cord with which the experiments of Goltz have made us acquainted; an irritation which, if prolonged, we might not unreasonably expect to be followed by vasomotor paralysis.

Hughes¹⁰² publishes an interesting article on neuritis plantaris in which he reports several cases of this disease.

Facial Paralysis.—Neumann¹⁷ publishes another paper in support of his view that the only constant and essential cause of the facial paralysis improperly attributed to cold is heredity. (See the ANNUAL of 1889, vol. ii, B-2.) Danion²⁴ speaks in high praise of mild galvanic currents in cases of facial paralysis, especially in the later stages. Koch²⁷³ reports a case of left-sided facial paralysis of a mild degree, in which, upon electrical examination, there was found, during the entire duration of the paralysis, an increased electrical excitability on the paralyzed side to both sorts of electricity and to both direct and indirect excitation; the contractions at first were rapid, but at the end of four months became sluggish. Late in the disease there was a diminution of the sense of taste on the left side of tongue, which showed that the chorda tympani was involved, and indicated that the disease was a slowly-spreading neuritis of the left facial nerve. Variot⁵⁵ reports a case of facial paralysis of more than thirty years' standing, due to caries of the temporal bone.

Hers⁵⁶³ reports a case of herpes of the left side of the face; the vesicles covering the chin, lips, cheek, temple, and ear, and invading also the mucous membrane of the lip, cheek, and tongue. The attack continued for three weeks, and was associated with much pain in the left side of the face and ear. When the attack of herpes had passed away there was a return of the pain, and a paralysis of the left side of the face appeared, from which a complete recovery took place in three weeks.

Gustatory Paralysis.—Hershey⁹ relates the case of a domestic aged 39, who was perfectly healthy in all respects, save

that the sense of taste (bitter, acid, sweet, and salt) was entirely absent. After a duration of six months this condition became somewhat improved.

MULTIPLE NEURITIS.

The general subject of multiple neuritis, and the lines along which investigations are being carried out in this department of neurology, were considered at length in the *ANNUAL* of 1889, vol. ii, B-4. One of the most interesting and valuable contributions to the subject of multiple neuritis during the year is the series of articles on this subject by Ross.⁹⁰ In his first article Ross discusses multiple neuritis in general, gives an interesting historical sketch of this disease, and submits the following classification of the different forms:—

- I.—The idiopathic form :—
 1. Acute (Landry's paralysis).
 2. Subacute.
 3. Chronic.
- II.—The toxic form :—
 1. *Diffusible Stimulants*.—Alcohol, carbon monoxide, carbon bisulphide, di-nitro-benzine (roburite), aniline.
 2. *Metallic Poisons*.—Lead, arsenic, mercury, and phosphorus.
 3. *Animal Poisons*.—Diphtheria, typhus, and other fevers; syphilis, tubercle, malaria, leprosy, beriberi.
 4. *Vegetable Poisons*.—Ergot, morphia, etc.
 5. *Endogenous Poisons*.—Rheumatism, gout, arthritis, diabetes, the puerperal state, chorea.
- III.—The *Dyscrasic Form*.—Chlorosis, marasmus, cancerous, and other forms of cachexia, vascular degeneration.
- IV.—Sensory, vasomotor, and trophic neuritis :—
 1. The neuritis found in cases of ataxia, and which has been named *neuro-tabes peripherica*.
 2. The vasomotor neurosis, first described by Weir-Mitchell, under the name of *erythromelalgia*.
 3. Raynaud's disease.
- V.—The irritative form of neuritis, in which spasm predominates over paralysis :—
 1. Professional hyperkineses.
 2. Tetany.

The rest of the series of articles is devoted to the consideration of Landry's paralysis and to the proof that it is a variety of multiple neuritis. For this purpose he tabulates all the recorded cases of Landry's paralysis, 93 in number. From a careful, minute analysis of these cases, which is too long to be reviewed in detail, Ross arrives at the result that Landry's paralysis coincides with multiple neuritis in regard to etiology, symptoms,

course, and termination, and he agrees with the general conclusions at which Nauwerck and Barth⁷⁶⁸ arrive, and which are as follow :—

1. A typical ascending paralysis, accompanied by slight sensory disorders, may prove fatal without the sphincters being implicated or the electro-muscular irritability being diminished, while after death it may be impossible to discover any morbid change, either in the central or peripheral nervous system.

2. No sure proof has hitherto been afforded that acute ascending paralysis is in any case caused by disease of the medulla oblongata or spinal cord, or of any part of the central nervous system.

3. If Landry's paralysis be defined so as to include cases in which the loss of motor power is accompanied by severe sensory disorders, affections of the sphincters, diminution or loss of the electro-muscular contractility, and the reaction of degeneration, then a considerable number of observations are recorded in which morbid lesions were observed in the peripheral nerves alone.

4. It has not been proved that even in the extended significance of the term acute ascending paralysis can be caused by disease of the central nervous system.

This interesting series of articles by Ross is not yet concluded, and will be further reviewed in the next ANNUAL.

In contradistinction to Ross, who ascribes to multiple neuritis a number of forms of disease (Raynaud's tetany, etc.), in which such connection is certainly as yet unproved, Joffroy and Achard⁴⁶⁷ publish two papers based on cases in which the authors consider the multiple neuritis found after death to be not the cause of the symptoms, but rather a complication or secondary process. The first paper is based on the record of a case in which well-marked symptoms of multiple neuritis—as persistent and severe pain, followed by muscular paresis and wasting of all extremities—occurred about nine months before the patient's death, which resulted from an attack of cerebral hæmorrhage and pneumonia. Degeneration of nerve-fibres was found in the main nerve-trunks of the limbs, and more marked in the peripheral nerves. In addition, there was found obliterating arteritis in the nerves, *e.g.*, in the sciatic, and it was to the resulting loss of nutrition that the "neuritis" was attributed. Indeed, a parallel is drawn between

the changes thereby produced in a nerve-trunk and those of cerebral softening from arterial thrombosis. It is remarked that, had the patient not succumbed to pneumonia, senile gangrene would have developed, and might have been referred erroneously to the neuritis; whereas, both conditions would have owned the same origin, viz., obliterating arteritis. The next paper, by the same authors, deals with a case of locomotor ataxia, complicated with cutaneous gangrene. The writers do not attribute the gangrene to the neuritis or to pressure, but refer the gangrene as well as the neuritis to the disease of the cord. Another factor in the production of peripheral neuritis in this case was the presence of tuberculosis, from the effects of which the patient died. Déjerine and Sollier⁴⁶⁷ report the case of a man 54 years of age, who for fifteen years had suffered from inco-ordination of the lower limbs, marked lightning pains, and disturbances of sensation. The patellar reflex was, however, present. The patient died from phthisis. The spinal cord and nerve-roots were found to be healthy, but there was very marked peripheral neuritis, especially in the cutaneous nerves of the lower limbs, less marked in the muscular nerves, and slight in the cutaneous nerves of the hands. The sciatic nerves were quite normal. It is pointed out that the recognition of peripheral tabes, due to neuritis, involving mainly sensory nerves, is of practical value, since peripheral neuritis is often curable. The authors regard the etiology of this case as obscure, neither alcoholism nor tuberculosis (although both had at one time or other been present) accounting for it.

Barrs⁵ publishes an interesting paper on those cases of multiple neuritis in which the sensory symptoms are entirely absent, or nearly so. He points out that though the motor and sensory fibres run close together in the mixed nerves, and would naturally be affected together by any disease of the nerve, yet at both their central and peripheral terminations there is a decided separation of the two sorts of fibres, which would allow of their being separately the seat of disease. He reports two cases to illustrate this idea, but the first one, in which sensory disturbances were entirely absent, might well have been a case of myelitis of the anterior horns.

Strümpell⁷⁶ reports a case of multiple neuritis which is remarkable on account of the severe bilateral facial paralysis, with electrical reaction of degeneration, and the extreme ataxia of the

legs which were present. The case rapidly yielded to treatment in which galvanism of the affected muscles and nerves was the principal agent, and ended in complete recovery. Scheiber⁸⁴ reports a case of partial amyotrophic-degenerative paralysis of both radial nerves, which was due apparently to a multiple neuritis, probably caused by exposure to cold.

A case reported by Putnam⁸⁵ is of interest, not only on account of its acute course, but also on account of the careful post-mortem examination. The case is that of a man, who, the next day after a severe wetting, complained of muscular pain and numbness of the feet. There rapidly developed a muscular paresis, associated with muscular tenderness and tenderness of the nerve-trunks. There was no disturbance of sensibility. The disease steadily progressed, and on the seventh day death occurred, rather suddenly, from asphyxia. At the autopsy, the most important changes discovered were nodular pulmonary hæmorrhages and acute splenic enlargement. A microscopic examination of the nerves and muscles showed extensive changes. The lesions found in the nerves consisted of an infiltration of small, round cells, with granular contents. Within the connective-tissue sheath of the nerve one or two "Mastzellen" were found. The axis-cylinders showed a number of swellings scattered here and there along the course of the fibres, their most common position being at or near the "annular constrictions" of Ranvier. The myeline sheath of the nerve seemed, at places, to be greatly diminished in quantity, this diminution occurring especially at the "annular constrictions" of Ranvier. The muscles showed a loss of transverse striation with an increase in the number of the muscular nuclei, and an infiltration of cells both in the connective tissue and around the vessels. The infra-muscular nerves were almost entirely destroyed. An examination of the spinal cord showed in the membranes and in many of the nerve-roots an infiltration of round cells, both around the vessels and among the fibres. The nerve-cells were normal. The medulla showed the same infiltration of small, round cells, and the general fullness of the blood-vessels, which was present in the cord, and which was probably due—at least in part—to the patient's dying from asphyxia. Although in this case Putnam could assign no cause for the disease except the exposure to cold and wet, yet on account of its acute onset and of the hyperplasia

of the spleen he is inclined to regard the case as one of infectious neuritis.

Alcoholic Neuritis.—Hadden,⁶_{Jan. 19} in a discussion in the Pathological Society of London, gives the results of the microscopical examination of 6 fatal cases of alcoholic paralysis. The spinal cord was normal in all. The nerves were examined in 5 of the cases and found to be degenerated, the change being parenchymatous in 3, mainly interstitial in 2. The change was usually more advanced in the smaller nerves. In all, probably, the neuritis became less intense in the ascending direction. The medulla had been examined twice and the motor convolutions twice, but no change was present. The lesion in the nerves consisted of granular degeneration of the myelin, then of partial removal of the contents, causing a varicosity of the nerve-fibres, and, lastly, complete disappearance of the degenerative *débris* with collapse of the sheath. In a single preparation fibres showing all these changes might be found, together with fibres normal or but little changed. The muscles often showed imperfect striation with a granular appearance of the fibres, and usually there were local accumulations of nuclei between the fibres. In all the cases there was pulmonary tuberculosis, and Hadden queried whether the tuberculosis might not be dependent on a neuritis of the pneumogastri-
cs. In the same discussion Ormerod exhibited sections from a case of typical alcoholic neuritis. They showed breaking up of the myelin and overgrowth of the endoneurium, the condition of the axis-cylinders being somewhat doubtful, some being destroyed, others still traceable. This patient also died of tuberculosis, but there was no change found in the pneumogastric nerve-terminals.

Siemerling⁷⁵_{Apr. 15} reports a case of alcoholic neuritis in a woman aged 51, a hard drinker, presenting the usual symptoms, and in which after death the spinal cord and nerve-roots were normal, while the peripheral nerves and the muscles showed the characteristic alterations, atrophy of the fibres, and inflammatory changes in the connective tissue.

Suckling⁶_{Nov. 23} observed a case of multiple neuritis due to the abuse of alcoholic drinks, in which, in addition to the usual symptoms, there was slight optic neuritis and well-marked dropped wrist; and Duménil³_{Sept. 4} reports a case of paralysis and œdema of the lower extremities due to alcoholic neuritis.

Neuritis Due to Carbonic Oxide Poisoning.—Jacoby,¹_{Aug. 17} in an interesting communication, gives 2 cases of peripheral paralysis due to poisoning by carbonic oxide, in the one case from coal-gas from a furnace, in the other from illuminating gas. He has collected the few cases of this rare affection which are to be found in medical literature. In the 2 cases reported the paralysis occurring immediately after poisoning by carbonic oxide must render the idea of a connection between the two very probable. The possibility of a pressure paralysis must certainly be thought of, but is rather a gratuitous supposition, as the first patient was found sitting in an arm-chair and was thence removed to a bed, so that pressure upon the external popliteal nerve could hardly have taken place; in the second case there is, in addition to the improbability of pressure having taken place, the fact that the paralysis did not implicate the supinator longus or the triceps. This partial localization of the paralysis makes it highly improbable that pressure should have been the cause. As regards the peripheral nature of the paralysis, there can be no doubt in either case. The localization of the paralysis, the strict confinement to a single nerve territory, the sensory disturbance, and the occurrence of the reaction of degeneration and atrophy, together with the further typical course, all make it safe to assume that we are dealing with a neuritis.

The lesson which directly results from these cases is that peripheral paralysis, affecting the radial or peroneal nerves, may be due to the action of carbonic oxide; that we are once more taught that it is not safe to draw positive lines of demarcation between the possible central or peripheral action of certain toxic agencies. It has furthermore seemed to Jacoby (but this is only an impression in support of which he has no facts) that both radial and peroneal paralysis occur most frequently in winter among the poor occupying small and unventilated rooms, generally heated by a stove in the room itself; that, as the second case shows, complete unconsciousness is not necessary for the production of such paralysis dependent upon carbonic-oxide intoxication, therefore it is possible that these paralyzes are, more frequently than we can at present admit, due to this cause. Further observation in this respect might prove of interest.

Neuritis Due to Metallic Poisons.—McClure,⁶_{Jan. 22} communicates

an interesting and very rare case of well-marked multiple neuritis in which after recovery there was a relapse, the cause of the neuritis being very probably chronic arsenical poisoning, due to tearing up and working with so-called Indian muslins which were found to contain arsenic. Suckling²_{Dec. 15, '98} reports 2 cases of multiple neuritis occurring in brass-workers, and says that he has seen other cases in men who worked with this metal. In all cases great improvement occurred under iodide of potassium.

Neuritis after Typhoid and Scarlet Fevers.—Ross⁵ describes 2 interesting cases of paralysis after typhoid fever probably caused by a multiple neuritis, and considers at some length the pathology of these forms of paralysis; and Seifert¹⁰¹²_{p. 77, '98} reports a severe case of multiple degenerative neuritis occurring in the seventh week of an attack of scarlet fever in a 5-year-old boy. The treatment consisted in massage, electricity, warm baths, salicylic acid, etc., and recovery eventually occurred.

Neuritis and Cerebro-Spinal Meningitis.—Upson²⁴² had a patient who suffered from an attack of multiple neuritis, from which she made a partial recovery and was able to be about, when she had a relapse which was accompanied by cerebro-spinal meningitis. At the autopsy the lesions both of cerebro-spinal meningitis and of a peripheral neuritis were found. (Compare with the ANNUAL of 1889, vol. ii, B-10.)

Neuritis and Pregnancy.—Desnos, Pinard, and Joffroy¹⁷ report the case of a woman who, in the fifth month of her third pregnancy, after her strength had been greatly reduced in consequence of uncontrollable vomiting lasting several months, developed within a few days a complete atrophic paralysis, first of the legs and soon afterward of the arms. The faradic excitability of the muscles was entirely absent in the legs and greatly diminished in the arms, and the tendon reflexes were absent. Objective disturbances of sensibility were absent, but the patient complained of pains and feelings of formication in the extremities. She also exhibited some mental impairment. After the induction of a miscarriage, and at the same time electrical and hydro-therapeutical treatment, the patient slowly improved, and in fifteen months was cured. Whitfield⁶_{Mar. 20} details the case of a woman aged 40, who in her seventh pregnancy suffered from the first from severe vomiting. In the sixth month it became very severe and prostrated her so greatly

that the question of inducing a miscarriage was seriously considered. During the pregnancy she lost about 80 pounds (36.4 kilogrammes) in weight, and for a fortnight before her labor, which was quite natural, her legs were cold and weak. The vomiting ceased the day after the labor and she began to take food. On the fourth day her legs became numb, and a few days later she suffered from burning and tingling not only in the feet but also in the hands. These symptoms ushered in a severe attack of multiple neuritis with extensive paralysis and atrophy. Under a course of treatment of strychnia and massage she slowly improved.

BERIBERI.

The most valuable article on this subject published during the past year is that by Pekelharing and Winkler.^{1013 6}
70, May 4, 11

The following is a summary of the most important points in this work: 1. Beriberi has no dependence on anæmia. 2. There exists a well-developed and recognizable initial stage for all forms of the malady. 3. The unity of the various clinical and frequently widely-differing forms of beriberi is confirmed by a close investigation into the electrical reaction of nerve- and muscle-tissue. 4. The majority of the symptoms are dependent on affections of nerve- and muscle-tissue, and these are due to a definite nerve-lesion degeneration. 5. In the blood of beriberi patients, bacilli and micrococci are to be found. 6. Pure cultures of such micrococci give a nerve degeneration of like nature to that found in beriberi when injected into rabbits and dogs. 7. The inhalation of air impregnated with such culture can originate a nerve degeneration in rabbits. 8. Beriberi must in all probability be regarded as a contagious disease, induced by the action of a micro-organism. 9. The infecting micrococcus can also exist apart from contact with the human being. 10. Direct transmission from one person to another rarely occurs; infection through wearing-apparel is more common. 11. The infecting material finds its way into the body principally through the respiratory organs. 12. The spread of the malady can be interrupted by disinfection, or, in a person attacked, by removal; when the symptoms are once well developed nothing but nature can effect a cure.

Miura²⁰
Feb.-July considers that the cause of kakke is the eating of decomposed fish belonging to the family *Scomiridæ*, especially the

species *Pelanoys orientalis* and *Thynnus albacora*. The remainder of his article consists in an amplification of his views in regard to the pathology and symptomatology of the disease, which he published in 1888. (See ANNUAL, issue of 1889, vol. ii, B-19, 20.) He closes with an enumeration of the indications for the faradization of the phrenic nerve in cases of kakke.

Gueit¹⁹⁵ publishes a description of kakke as it occurs in Japan. He indorses the view that it is a multiple neuritis due to the action of a micro-organism. Couto, of Bahia,¹⁴ publishes an interesting lecture on beriberi, with the report of a case, and a paper by Morris² is of especial interest on account of the clinical picture which he draws of the disease.

MUSCULAR DYSTROPHIES.

In the ANNUAL for last year, vol. ii, B-26, an extended review was given of the muscular dystrophies. At that time the general tendency was to divide the muscular dystrophies into two great groups—the one, amyotrophica spinalis progressiva, due to disease of the anterior horns of gray matter in the spinal cord; the other, dystrophica muscularis progressiva, due to primary disease of the muscles. The differences in the clinical history and in the appearance of the excised muscle in these two forms of disease were described at length. During the past year much work has been done in this field, and the results obtained are somewhat contradictory. One set of observers, of whom Hoffmann is the most prominent, would subdivide the progressive forms of muscular atrophy still further, and would set up a third class—the peroneal form—due to disease of the peripheral nerves; so that there would be three forms of progressive muscular atrophy, differentiated from each other both clinically and anatomically, each one corresponding to a lesion of one of three tissues (lesion of any one of which we have for a long time known would cause muscular atrophy), viz., the anterior horns of gray matter of the spinal cord, the peripheral nerves, and the muscles. In this way all the cases of progressive muscular atrophy would fall in one or the other of the four following classes: 1. Progressive spinal muscular atrophy, due to disease of the anterior horns of the spinal cord and corresponding to the type Aran-Duchenne. 2. Progressive neurotic muscular atrophy, due to disease of the peripheral nerves and

corresponding to the peroneal type. 3. Progressive idiopathic muscular atrophy, due to primary disease of the muscles and corresponding to the scapulo-humeral type (Erb's form), the facio-scapulo-humeral type (Landouzy-Déjerine form), and the hereditary form of Leyden. 4. Pseudo-hypertrophic muscular paralysis, due to primary disease of the muscles, and exhibiting the closest relationship, both anatomically and clinically, to the third class.

On the other hand, the work of a number of observers, such as Hitzig, Oppenheim, and Siemerling, has been such as to wipe away the clinical and especially the anatomical distinction between the spinal and myopathic forms of progressive muscular atrophy, and to bring them again together into one class. The different papers bearing on this point are of great interest.

Hoffmann³⁰⁸ endeavors to establish a third class of progressive muscular atrophy—the neurotic—which depends anatomically upon a lesion of the peripheral nerves, and possesses such characteristic clinical features as to differentiate it clearly from the other forms. Hoffmann gives a short review of the literature of the subject, and finds that quite a number of cases of this form of disease have been reported, and in particular Charcot and Marie⁹² have made a clear clinical picture of the disease, and Tooth¹⁰¹⁴ has collected 20 recorded cases, among which were 4 post-mortem examinations. In 3 of these autopsies there was found a well-marked interstitial neuritis affecting the nerves supplied to the atrophied muscles; so that it is possible that this type of disease is a true neuropathy, using the term neuropathy in its restricted sense. Tooth proposed for this type the provisional name of the “peroneal type of progressive muscular atrophy,” and under that title a number of cases have been reported during the past two years. (See ANNUAL, 1889, vol. ii, B-34.) Hoffmann endeavors to establish this neurotic or neuropathic form of progressive muscular atrophy on a firm basis as a clinical entity. He reports a new case of a girl, aged 8 years, in whom the disease commenced in infancy, and describes the condition in 1888 of the 3 cases of this disease which Schultze⁴ described and published in 1884, hoping thus to get a more complete picture of the disease in its different stages.

From a careful examination and analysis of the symptoms in these cases, Hoffmann comes to the following conclusions in regard

to this disease: It usually develops on a hereditary basis. Males are more frequently attacked than females, and it is often inherited through mothers who are free from the disease. It is sometimes present from birth, usually develops before the age of 20 years, and has appeared once even after the age of 40 years. The disease probably commences in the small muscles of the feet, but by the time that it has advanced sufficiently to attract much attention the peroneal muscles are also involved. The atrophy and weakness extends to the extensors of the toes, and in the course of one or two years all the muscles below the knees are the seat of atrophy and are correspondingly weak, and the feet are held in the position of pes-varus or equino-varus. The atrophy and consequent weakness next attacks the small muscles of the hand, often producing "clawed hand," and slowly extends to the muscles of the forearm; while in the same way in the legs the disease gradually extends from the periphery toward the body and attacks the muscles of the thigh. In this type of the disease, then, it is characteristic that the muscular atrophy and consequent weakness commence at the distal portions of the extremities (commencing in the lower extremities) and gradually extend toward the body. To such an extreme degree is this true that in the long muscles, such as the vasti muscles of the thigh, the distal portion of the belly of the muscle is more atrophied than the proximal. The muscles of the upper arm, shoulder, back, and face are not attacked till very late in the disease. The muscular atrophy is symmetrical, and muscular hypertrophy has never been observed. The atrophying muscles are the seat of fibrillary contractions, and especially of tremors and restless movements. The mechanical excitability of the muscles and the tendon reflexes are abolished or diminished in the atrophic muscles, and sometimes diminished in muscles which are not atrophied. Neither the muscles nor the nerves are sensitive on pressure. On electrical examination of the nerves and muscles a more or less pronounced reaction of degeneration is found. In a few cases pain is experienced and some anæsthesia. Hoffmann considers at length the differential diagnosis between this form of disease and the other diseases which cause muscular atrophy, and closes his article with a report of all the autopsies on cases of this form of disease which have been published, from which it appears that the disease is due to an

interstitial neuritis, which Hoffmann regards as in turn dependent upon primary disease of the ganglion-cells of the spinal cord.

Hoffmann⁷⁵_{July} contributes a second article to the subject, "Progressive Neurotic Muscular Atrophy," in which he states that Virchow has found in a case of this kind an ascending neuritis of the peripheral nerves and a degeneration of the posterior columns, especially of the columns of Goll. In another case, which has previously been reported both by Friedreich and Schultze, Hoffmann found a degeneration of the motor and sensory nerves, of the anterior and posterior nerve-roots, of the whole posterior columns in the lumbar enlargement, and above the lumbar enlargement of the columns of Goll alone, together with atrophy of the multipolar ganglion-cells in the anterior horns. This complex of lesions serves to distinguish progressive neurotic muscular atrophy from all other nervous diseases. The question whether the lesion commences in the spinal cord or in the peripheral nerves still remains unsolved, with the probabilities in favor of its peripheral origin.

Babes²⁹⁰_{Jan} examined microscopically 4 cases of primary muscular atrophy. The histological changes in these cases had so much in common that it is possible to speak only of different stages in development of the process. The affection develops on the basis of hereditary predisposition. The vessels (veins and lymph-vessels) at some stages of development are not sufficient for the removal of the fat formed in the tissues, and at the same time there is a proliferation of the vascular walls which may lead to thrombosis. Then the interstitial tissue becomes richer in cells, the fat increases, and the muscular fibres are pushed apart. Now the muscular fibre hypertrophies, the myolemma exhibits an increase in the nuclei, the muscular substance takes on a hyaline character, and the transverse striations disappear. At the same time the interstitial tissue is infiltrated with small, round cells. If the process continues, the muscular fibres become fatty, degenerate, and disappear, and are surrounded by a tissue consisting of fusiform cells and fat cells. The process attacks the peripheral nerves only secondarily. There first develops an œdema of the nerve-sheath, followed by multiplication of nuclei. Changes in the medullary substance of Schwann and the axis-cylinder may occur, but are usually slight.

Gombault⁴⁵⁷_{p. 467} reports a case of dystrophia muscularis progres-

siva in which, although the anterior horns of the spinal cord were normal, the peripheral nerves exhibited a peculiar change, consisting in swelling and destruction of the axis-cylinder, while the medullary substance of Schwann still appeared normal, and there was no multiplication of nuclei nor growth of protoplasm.

On the other hand, a number of articles have been published which make it doubtful if the differentiation of the various forms of progressive muscular atrophy can be maintained. One of the most important of these is the one embodying the researches of Oppenheim and Siemerling,⁸⁸⁵ which throw great doubt on any differential diagnosis based on the histological examination of excised portions of muscle. As the result of numerous experiments, Oppenheim and Siemerling find that portions of muscles excised during life present very much larger primitive fibres than is found in the muscles after death, and thus in excised portions of muscles the fibres appear hypertrophied, and this apparent hypertrophy is the direct consequence of the excision. This appearance of hypertrophy depends upon a well-known physiological phenomenon that muscular fibres, in consequence of the irritation of excision and of the chemical reagents to which they are exposed, contract; that is, they become shorter and thicker, and hence appear hypertrophied. This is proved by the further experiments made by Oppenheim and Siemerling, which showed that when the muscles were attached to a little stick before excision, so that they could not contract, that such fibres, after excision, had a diameter of about half that of fibres excised without any such precautions, showing clearly that the increase in diameter was due to contraction of the muscular fibres. In these contracted fibres the number of nuclei in the sheath was nearly twice as many as in the fibres, which were prevented from contracting. In this connection we must point out that Auerbach⁸⁸⁵ states that in 1872 he pointed out²⁰ the error to which Oppenheim and Siemerling call attention, and that he also gave a test by which it could be decided whether the fibre was really hypertrophied or merely contracted, and that this test consisted in measuring the distance between the transverse striations of the muscular fibres.

The valuable paper of Hitzig offers further proof that the spinal and myopathic forms of progressive muscular atrophy cannot be sharply differentiated from each other. (Compare with ANNUAL

of 1889, vol. ii, B-30, Case IV, of Hitzig.) Hitzig ^{July 18} gives the results of the autopsy of a woman aged 25 years, who in infancy had suffered from poliomyelitis anterior acuta. There were found the changes characteristic of this disease scattered in numerous foci in the right anterior horn throughout the lumbar enlargement of the cord, as well as degenerative changes in the anterior nerve-roots and in the peripheral nerves. The atrophic muscles of the right leg were infiltrated with fat, and the muscular fibres were mostly atrophied; but there were also a considerable number of bundles of greatly hypertrophied and rounded fibres (even to 175 μ), and in the neighborhood of the hypertrophied fibres there was less fat deposited in the septa between the fibres. The nuclei of the hypertrophied fibres were increased in number, and some of the fibres contained vacuoles, while their transverse striations were very distinct. In this case, then, of muscular atrophy, due undoubtedly to disease of the spinal cord, the atrophied muscles contain atrophied, normal, and hypertrophied muscular fibres, a condition of things which has been regarded as proving that the atrophy was due to a primary disease of the muscles—myopathic. If it be granted that hypertrophied fibres occur in cases of muscular atrophy, due to disease of the spinal cord, then muscular dystrophies and muscular atrophies of spinal origin cannot be differentiated from each other, and this classification must be abandoned. (In this connection compare the case of Heubner's and that of Preiss's in ANNUAL of 1889, vol. ii, B-33.) Hitzig further points out that Müller, ¹⁰¹⁵₇₁ Leyden, ⁷⁶⁰_{2, 4, p. 276} Déjerine and Huet, ⁴¹⁰_{Apr. '90} and Joffroy and Achard, ⁴⁵⁷_{v. 1, p. 94} have all reported cases of myelitis of the anterior horns, in which, at the autopsy, in addition to the lesions in the spinal cord, the atrophied muscles contained a number of hypertrophied fibres, and, in some cases, consisted almost entirely of such fibres. It would seem, therefore, that this mixture of atrophied, normal, and hypertrophied fibres occurs not rarely in cases of muscular atrophy of spinal origin, and Hitzig supposes that in such cases the nervous elements in the spinal cord which preside over the nutrition of the muscular fibres are not destroyed, but, existing under pathological conditions, therefore cause abnormal nutritive processes in the muscular fibres. Schultze has already acknowledged that most of the clinical symptoms indicative of disease of the anterior horns may be more or less well marked also

in the myopathic forms, and now the anatomical distinction is no longer decisive. A number of cases show us that we do not understand the relationship between the trophic functions and the anatomical structure of the spinal cord, and that it is very possible there may be trophic disturbances due to functional derangements of the spinal cord. In the discussion following the reading of this paper, Erb and Schultze³⁰⁸_{and p. 661} both agree with the reader that the spinal and the myopathic forms of muscular atrophy cannot be sharply differentiated from each other clinically, and that the pathological anatomy of the spinal cord is not sufficiently developed to enable us to say definitely whether a muscular atrophy is of spinal or of non-spinal origin.

In this connection the case of Kobler is of much interest. Kobler⁸⁴_{May} reports a complicated case of neuro-muscular disease. A boy aged 8 years was attacked when 6 months old by an infantile paralysis of the right arm, which improved, leaving only a paralysis of the muscles about the shoulder-joint. Since his third year there has been hypertrophy of the muscles of the right thigh without any impairment of function, although the gait was somewhat similar to that in pseudo-hypertrophic paralysis. At the time of the observation the deltoid, biceps, and brachialis internus muscles of the right side were almost completely paralyzed, atrophic, and inexcitable by electricity, and the muscles of the right shoulder-girdle were atrophic but not paralyzed, and were excitable by electricity, while the peripheral muscles of the arm were normal. There were also present spinal symptoms, as hyper-tonicity, exaggerated reflexes, and tremor of the lower extremities. Kobler finds in medical literature a number of cases of persons who in infancy suffered from poliomyelitis anterior acuta, and were attacked in later life by progressive muscular atrophy; but, as Kobler points out, the case reported by him is a combination of four different types of disease. The poliomyelitis anterior acuta occurring in the first year of life, and attacking the muscles in the upper arm, was followed after several years by a progressive myopathic atrophy of the adjacent muscles of the shoulder-girdle, further by a true muscular hypertrophy of the muscles of the thigh, and, finally, by the spastic symptoms indicating a lateral sclerosis of the spinal cord. This case, then, of disease attacking on several occasions different and remote points of the motor ap-

paratus, indicates that the whole motor tract, including the ganglion-cells interpolated in the course of its fibres, and the muscles in which the fibres terminate, is to be regarded as a trophic and functional unity.

Rémond⁷³_{Jan. 15} describes a somewhat similar case of progressive muscular atrophy of spinal origin and of the scapulo-humeral type, consecutive to an attack of infantile paralysis. The patient, aged 40, with strong hereditary predisposition to nervous disease, at the age of 2 years had an attack of infantile paralysis, involving at first all four extremities, but from which he entirely recovered except for a paresis and contracture (*pes equino-varus*) in right leg. When 30, and again when 33, years of age he fractured his right humerus, and when 36 years of age he noticed a weakness and atrophy of the muscle about the right shoulder, which then extended to the other muscles of the arm and to the muscles of the left shoulder, and finally involved also the muscles of the thighs. The atrophied muscles were the seat of well-marked fibrillary contraction, and a number of them exhibited the electrical reaction of degeneration. Rémond considers that in this case the infantile paralysis left the anterior horns of the spinal cord in a pathological condition, which was awakened into activity some thirty years later by the traumatism by which the humerus was twice fractured.

Mills,² divides the dystrophies into four classes of muscular, neural, spinal, and cortico-spinal origin. Muscular atrophy may complicate ophthalmoplegia externa, bulbar paralysis, poliomyelitis, any form of spinal sclerosis, and also affections of the joints. He reports 7 cases exhibiting different forms of muscular atrophy.

The other contributions to the subject of muscular dystrophies consist principally of reports of cases. Putnam²⁴²_{Mar.} reports the case of a woman, aged 45 years, with wide-spread atrophy of nearly all the muscles of the body. The disease commenced in her legs at the age of 17 years and steadily increased. There was no muscular hypertrophy and no reaction of degeneration. Pieces removed from two of the muscles and examined microscopically showed slight fatty degeneration and a tendency to split into fibrillæ, the transverse striation for the most part being preserved. The muscular fibres on transverse section varied greatly in size, some being half, others twice, as large as ordinary fibres, and were rounder, the interstice between them being filled up by connective tissue con-

taining here and there a large number of cells. One small nerve-fibre was found which appeared normal. Bernhardt²⁰_{A.I.U.M.} contributes 3 cases of progressive muscular atrophy in cousins, in some of whose ancestors the disease had also occurred. The cases presented a type of disease midway between that of Aran-Duchenne and that of Erb's juvenile form. The disease commenced in the muscles of the shoulder-girdle, fibrillary contractions were present in a moderate degree, and after a duration of about two years the patient died from bulbar paralysis. None of the cases presented any signs of hypertrophy or pseudo-hypertrophy of the muscles. No autopsy was had in any of the cases, and Bernhardt regards the lesion as being situated in the spinal cord and medulla. Stern⁶⁵¹_{A.M.A.} reports a case of the juvenile form of progressive muscular atrophy in a girl aged 11 years. The disease commenced at the age of 4 years. The muscles at the right side of the face were atrophied and also (what has not previously been described) the right side of the tongue. The right leg was shorter than the left, and the right foot was in a position of varo-equinus, as in a case which Westphal has reported, and has considered as an accidental complication from an attack of infantile paralysis in infancy. C. Winkler⁵⁶³_{V.I.M.} communicates a case of the juvenile form of progressive muscular atrophy of the facio-scapulo-humeral type occurring in a woman aged 25 years, who came from a tuberculous family, and in whom the disease first manifested itself in early childhood by a peculiar countenance, the left side of which was longer than the right. In her sixth year the arms began to be involved, and at the age of 22 years walking became difficult. The muscles of the eyeballs were involved as well as those of the face, but not those of the tongue or palate. The muscles of the shoulder-girdle and back were atrophied, but not those of the arms nor those of the pelvic girdle and legs.

Campbell²⁸⁴_{M.A.} publishes a paper to show the influence of heredity in the production of progressive muscular atrophy. Twenty-seven members of the family were attacked, 15 being females and 12 males. Only 1 recovered. The mean duration of the illness was about eighteen months, and the average age at death was about 45. Two cases occurred in the first generation, 8 in the second, 13 in the third, and 4 in the fourth, but the majority of the fourth generation have not arrived at the age at which they are liable to be

attacked with the disease. Troisier and Guinon,⁹² report 2 cases of dystrophia muscularis progressiva, occurring in a father and his daughter. The disease of the father was of the scapulo-humeral type, had existed thirty-four years, and had commenced in his shoulders. Seventeen years after the muscular atrophy and weakness had commenced in the shoulders it had attacked the thighs and legs, but even after the lapse of thirty-four years the muscles of the hands and forearms were normal. The disease of the daughter was of the facio-scapulo-humeral type, although the atrophy commenced in the shoulders. The disease had existed eight years, and had not apparently been modified in any respect by hereditary syphilis, from which she also suffered. Joffroy and Achard,⁴⁵⁷ report a case of dystrophia muscularis progressiva without any hereditary predisposition.

Sperling,⁷⁵ described the case of a girl, aged 16, suffering from dystrophia muscularis progressiva of the facio-scapulo-humeral type, following an attack of diphtheria. Of especial importance in this case was the result of the electrical examination of the muscles, which showed that almost all the muscles of the body, even those which were not atrophied, exhibited a great diminution of excitability, both to the faradic and the galvanic current. The reaction of degeneration was not present. The muscles further exhibited no reaction to a spark of static electricity. Osler,⁵ Gray,¹ Bäumlér,³⁰⁸ Riegel,⁶⁹ and Homén,⁷⁵ each report a case of the juvenile type (Erb) of progressive muscular atrophy.

Berthet,²¹¹ reports a case apparently of progressive muscular atrophy commencing in the muscles of the hand, in which there was much improvement under massage. Knapp,⁹⁰ reports a case of progressive muscular atrophy (type Aran-Duchenne). The special point of interest about the case is the man's age. He is 68 years old, and it is certainly a very rare thing to find this disease coming on at such an advanced age. D'Evelyn,⁷⁷ describes 2 cases of progressive muscular atrophy (type Aran-Duchenne), in the first of which there may be some doubt as to the diagnosis.

Pseudo-hypertrophic Paralysis.—Rieder,⁸⁴ Anton,⁸⁴ Suckling,⁶ Nicholson,⁶ Hershey,⁹ Beavor,⁶ Hanford,⁶ and Ryan,⁶¹ each report cases of this disease, all of which are of

interest, but none of which add much to our knowledge of this form of muscular dystrophy.

Muscular Atrophy Associated with Other Diseases.—Bazy,⁷³ in a very suggestive article, points out that the muscular atrophy consecutive to lesions of the joints, although well known, has received neither the attention nor the treatment which it deserves. He cites a number of cases of injury to the joints in which, after the inflammatory symptoms had entirely subsided, and the movements of the joints were free and painless, when the patients attempted to use the joint, as in walking, the pain returned, and persisted in spite of counter-irritation and other forms of treatment. In such cases examination showed the joint to be normal in all respects except that the points of insertion of the articular ligaments were tender on pressure, and Bazy interprets this tenderness to mean that these ligaments are strained or slightly torn, because the atrophic and hence weakened muscles do not hold the joint firmly in a normal position, and in consequence the articular ligaments are abnormally stretched and strained. In these cases when the atrophied muscles are treated with massage and electricity the pains cease, and the patient can use his joint again without difficulty. In some cases, in addition to this treatment, it is desirable to firmly bandage the joint for a time. Griffith and Dercum,⁹ each report a case of extensive muscular atrophy associated with articular rheumatism. Harrison,⁶ reports 6 cases of atrophy of the deltoid following injury, which were rapidly and completely cured by passive circumduction of the arm.

Schulz,⁷⁵ publishes a case of scleroderma associated with the pigmentation of the skin characteristic of Addison's disease and with muscular atrophy. The case ran a very rapid course and after death there were found, in addition to the changes in the structure and pigmentation of the skin characteristic of scleroderma and Addison's disease, an extensive degeneration of the muscles and of the anterior roots of the spinal nerves and a moderate degeneration of the peripheral nerves, the spinal cord and the medulla oblongata being entirely normal. Unfortunately, the spinal ganglia were not examined. Schulz considers the changes in the anterior nerve-roots as a primary lesion from which the muscular degeneration naturally results, and argues in support of the view that scleroderma and Addison's disease are best explained

as trophic disorders due to the lesion of the peripheral nerves. In consequence of the disease of the peripheral nerves and the concomitant implication of the vasomotor nerves, there results, in the first stage of the disease, a dilatation of the blood-vessels with transudation and inflammatory oedema of the muscular and cutaneous tissues, which inflammatory oedema is accompanied by an exudation of red blood-globules which subsequently degenerate and their coloring matter is gradually converted into the pigment which is found in the skin; and in the second stage of the disease, in consequence of the abnormal activity of the trophic nerves, atrophy and degeneration appear in the skin and muscles. The symmetrical pigmentation, like symmetrical gangrene (Raynaud's disease), depends on nervous influence. Déjerine, ⁸_{July 21} in 4 cases of hemiplegia presenting a very decided degree of muscular atrophy and in which the degenerated muscles showed an altered electrical reaction, found the spinal cord entirely healthy, but, on the other hand, found the nerves supplied to the muscles the seat of an extreme degree of neuritis. (In cases in which the muscular atrophy was slight, no changes were found in the spinal cord nor in the peripheral nerves.) This neuritis was most intense near the muscles and did not extend far along the nerves toward the spinal cord; it might then be secondary to the changes in the muscles, which were very pronounced. Preston ¹⁰⁴_{Dec. 15, '90} has a short article on affections characterized by muscular atrophy.

Myositis.—Plehn ⁶⁰_{Mar. 21} reports a case of polymyositis running its course with severe symptoms and ending in recovery in ten days, in which the diagnosis is not above all doubt. Bokay ¹¹³_{Apr. 21} describes a case of myositis ossificans progressiva in a child, and Kroncker ⁴¹_{Apr. 15} describes a case of the same disease occurring in a woman aged 56 years.

Muscular Hypertrophy.—Lesage ⁹²_{Aug. 20, '90} details a case of typhoid fever, followed by a phlebitis in the left leg. In the following year there gradually developed an enlargement of the left leg, which was apparently due to hypertrophy of the muscles, especially those of the calf. The left leg was stronger than the right, but became tired more quickly. Lesage considers the condition to be one neither of true nor false muscular hypertrophy, but to be due to a deposition of fat between the muscular fibres, which deposition of fat was due to a chronic inflammatory condition (which could be

demonstrated) of the popliteal and peroneal arteries. Pal⁸_{Mus.} describes the case of a man aged 24 years, of deficient intelligence, who suffered from an attack of right hemiplegia in his second year, from which he made an almost complete recovery. In his twentieth year there began a gradual increase in size of all his muscles, associated with weakness. None of the muscles of the body show any trace of atrophy, all are hypertrophied, and those of the left side of the body more than those of the right. The fingers of the right hand are in almost constant motion (of the nature of athetosis), and the right arm is frequently the seat of tonic cramp. Sensibility is normal, reflexes exaggerated. Microscopic examination of the muscles show that a great majority of the fibres are hypertrophic. The nature and cause of the muscular hypertrophy in this case is obscure. Bruck⁶⁰_{Mus. 21} reports a very interesting case of an idiotic infant, aged 10 months, who presented a macroglossus of such an extreme degree that it was necessary to extirpate two large wedge-shaped pieces from it. Six months later the enlargement of the tongue returned to a very considerable degree, and was found to be associated with an extreme degree of hypertrophy of all the muscles of the body. The hypertrophied muscles reacted normally to both kinds of electricity. The microscopic examination of the muscles extirpated during life and after death certainly showed that the muscles were absolutely healthy. The enlargement of the tongue was also found to be entirely due to an increase in the muscular fibres, and was, therefore, due to the same cause which produced the general muscular hypertrophy; and Bruck would refer the idiocy also to this same, though unknown, cause. This is the eighth case of true muscular hypertrophy which has been reported.

Absence of Muscles.—Erb⁷⁵_{Jan. 1, 18} reports a case of almost complete absence of the trapezius muscle on both sides. The patient, a 20-year-old peasant, in whose family no similar disease had occurred, suffered since the age of 12 years with attacks of somnolence, lasting from one to two days, and occurring about once a fortnight. Associated with these was an increasing loss of memory and spasmodic twitching of the head. At the age of 12 years his tailor first noticed the deformity, due to the absence of the trapezius muscle, and it was noticed that he bent over more than normal at his work, and that he could not lift heavy weights well,

and during the past year he was unable to do hard work. On examination a complete absence of the trapezius muscle was found, with the exception of a narrow band near its middle on both sides running to the spine of the scapula, and a second narrow band a little higher up on the left side running to the clavicle. Both shoulders hung down and forward very decidedly, in consequence of which the chest seemed very small and flat. The inner border of the scapula on both sides stood abnormally far from the middle line, slightly diverging in their upper parts, and the whole back was abnormally rounded. The patient found great difficulty in raising his arm, especially the right arm, on which side there was less of the trapezius muscle preserved than on the left. The other muscles of the back were normal, and the deltoids were slightly hypertrophied. The portions of the trapezius muscles still remaining reacted normally to electricity and exhibited no fibrillary contractions. No case similar to this is to be found in medical literature. The microscopical examination of excised portions of the muscle exhibited no change except uniform enlargement of the muscular fibres, with an increase in the number of nuclei. Portions of the deltoid muscle examined microscopically exhibited no changes except for a slight increase in the size of the muscular fibres, which, however, was not nearly so great as in the case of the trapezius muscle. Whether the absence of the muscle was a congenital defect or whether it was the result of a rudimentary form of dystrophia muscularis progressiva Erb is unable to decide. Eulenburg,⁷⁵ had a case in which the trapezius muscle on the right side was almost entirely absent, except for a band of muscular substance along its lower border. He is inclined to regard the anomaly as a congenital defect, although nothing can with certainty be predicted regarding it. Bradel reports an interesting case of congenital absence of the right pectoralis major and minor muscles in an otherwise healthy and strong man, the report being illustrated by two plates, and Schulthess, Kobler, and Tuberosky⁷⁶ have observed similar cases.

FACIAL HEMIATROPHY.

Closely allied to the muscular dystrophies is facial hemiatrophy, which seems to depend on peripheral neuritis. Virchow in 1880 exhibited 2 cases of the disease before the Berlin Medical

Society, which he attributed neither to disease of the vasomotor system nor to that of the facial nerve, but to disease of the trigeminal nerve. Mendel ⁷⁵_{July 15} publishes the report of the autopsy on one of these cases described by Virchow. The patient was a woman, aged 50 years, who in her 25th year, while in the puerperium, suffered from facial erysipelas followed by pain in the left cheek and eye, lasting about a year, and accompanied by a slight pain in the left forearm. At the end of a year the pain gradually ceased, and she noticed a falling-in of the left side of the face, commencing in the left ala nasi. The atrophy slowly advanced, and fifteen years later she was seen and described by Virchow, who found it to be a typical case of left facial hemiatrophy combined with an atrophy exclusively limited to the left radial nerve. Ten years later she came under the care of Mendel, who found a left-sided facial atrophy, corresponding, as is usual in such cases, to the branches of the trigeminal nerve. In the domain of the first branch, especially along the course of the frontal nerve, was a groove running from the upper eyelid to the median line of the forehead, which could be followed to the line of the hair, and just before reaching it divided into several branches. In the domain of the second branch the atrophy was much more decided; and deep grooves resembling scars marked the course of the nervi palpebrales inferiores and of the nervi nasales subcutanei. Grooves were also evident over the outer border of the left upper lip. In the domain of the third branch there was only a slight groove over the course of the nervus mentalis. The grayish-yellow skin was everywhere thin, and was very different on the two sides of the face. In many places the skin seemed to be adherent to the underlying bone. All the muscles of the left side of the face were smaller than those of the right, and the left side of the tongue was smaller than the right. The muscular excitability, both direct and indirect, and to both kinds of electricity, was diminished. The difference between the two sides of the face was most evident when the facial muscles were in activity. The left eyeball was deeper in the socket than the right, and the left eyelid could not be completely closed on account of the weakness of the orbicularis muscle. The bones of the skull were not affected. The sensibility of the left side of the face was in no sense impaired. There was also a line of atrophy beginning between the fourth and seventh

dorsal spinous processes, and running over the infra-spinatus muscle, which was greatly atrophied, to the axilla, thence down the back of the arm, and then on its volar surface, and attaining its greatest intensity along the radial side of the forearm and hand. In this domain the skin was thin, of a slightly yellow color, with very prominent blood-vessels, the subcutaneous fat and muscles were atrophic, and the skin seemed more or less adherent to the bone. There was no atrophy of the bones, and no disturbance of sensibility.

The post-mortem examination of the nervous system and muscles of this patient revealed the terminal stage of a neuritis interstitialis prolifera of all the branches of the trigeminal nerve from its origin to its peripheral termination, which was most marked in the second branch. The left radial nerve was also the seat of a neuritis interstitialis prolifera, while the left facial nerve was entirely normal. There was also an atrophy of the descending root of the trigeminal nerve and a partial atrophy of the substantia ferruginea. The spinal nerve-roots were normal, and the spinal cord was normal except that on a level with the fifth cervical nerve (origin of the radial nerve) the nerve-cells in the anterior horns were decidedly fewer on the left side than on the right. An examination of the muscles showed a simple atrophy on the left side, the thickness of the muscular fibres being, left, 9-21 μ ; right, 12-30 μ . An examination of the skin of the face showed a very striking atrophy of the corium of the left side. Mendel closes his article with a brief consideration of the 86 cases of facial hemiatrophy which have been reported.

Ruheman³¹⁹ reports a case of hemianæsthesia and hemiatrophy of the right side of the face associated with many trophic disturbances, a combination of symptoms which must depend on a lesion of the trigeminal nerve, a lesion of the facial nerve being excluded by the absence of muscular paralysis and by the presence of the normal electrical reaction of the muscles.

Bramwell, of Edinburgh, collaborator,⁷⁸⁶ describes an interesting case of facial hemiatrophy, illustrated by 3 admirable lithographs. The patient was a joiner, aged 42 years, in whom the disease had existed during two and one-half years. The atrophy, which was very striking, implicated chiefly the connective tissue and fat of the right side of the face, while the muscles were but little affected, except the masseter and temporal muscles and the

right side of the tongue, which were certainly atrophied. Rosenthal⁴ reports the case of a girl, aged 8 years, which he regards as a case of partial scleroderma, with transition into a facial hemiatrophy, the latter being secondary, not primary, and considers that a neuritis of adjacent peripheral trophic nerves is the cause common to both affections. Kalt⁷³ gives a case of atrophy of the right side of the face in a girl aged 11 years, which was noticed in infancy and has grown steadily worse. On the inferior eyelid there were 2 or 3 rows of eyelashes. The right eye was myopic and the seat of a choroiditis, while the left eye was normal. Bechterew⁵⁹⁰ cites a case of facial hemiatrophy in the domain of second and third branches of the left trigeminal nerve of a 4-year-old girl, which followed a sudden fright. The left side of the tongue was also atrophic. Sensibility was intact. The faradic and galvanic excitability of the affected muscles was diminished. Ephraim⁴ describes a case of facial hemiatrophy of uncertain origin in which the atrophy was limited to the distribution of the second and third branches of the right trigeminal nerve. There was a decided increase in the electrical excitability of the muscles in the atrophic regions.

ACROMEGALY.

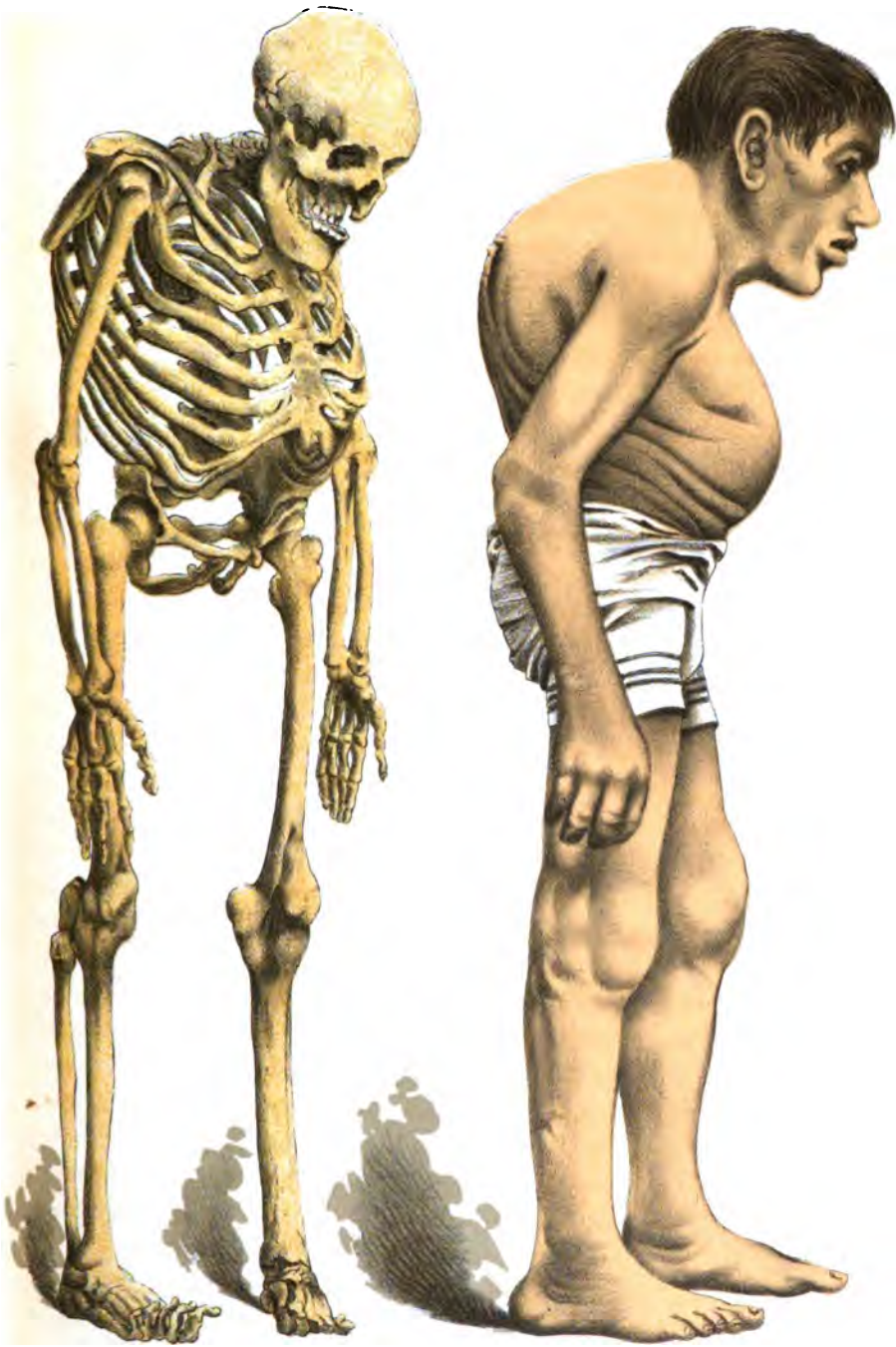
Much interesting work has been done during the past year in the study of that most remarkable dystrophy, acromegaly. Marie,⁷³ who first in '86 gave a description of acromegaly based on an examination of 2 cases in the service of Charcot, and who published reports of 2 other cases in '88, gives the following description of this condition based upon 6 cases which he has himself observed, and upon 16 cases reported by other observers. Acromegaly is characterized clinically by a remarkable hypertrophy of the extremities: hands, feet, and head. The hands are enormous, though of fairly normal proportions, their breadth being slightly out of proportion to their length. The fingers are sausage-shaped, joints enlarged, the lines in palms of hands greatly accentuated. The hypertrophy affects the soft parts as well as the bones, and along the radial sides of the hand there is a great redundancy of flesh, especially near the hypothenar eminence. The wrist is also enlarged, but to a less degree than the hand; the forearm rarely exhibits any hypertrophy, and then only in its lowest part, while the upper arm often appears smaller than normal. The feet are

enormous, and there is a large cushion of flesh along their external border. The tendo Achillis, the maleoli, and to a less degree the head of the fibula and tibia may be enlarged, while the leg and thigh are not hypertrophied, although the knee is often enlarged by an hypertrophy of the patella and condyles. In regard to the head, the cranium is but slightly altered, while the face, on the other hand, is elongated and notably changed. The brow is usually low, with a decided prominence of the supra-orbital ridges (due to dilatation of the frontal sinuses), the eyelids are often elongated, thickened, and the tarsal cartilages hypertrophied. The nose is enlarged, often enormously; the cheeks are flattened and elongated and the cheek-bones prominent (due to dilatation of the antrum). The upper lip is slightly, the lower lip greatly hypertrophied and everted. The chin is large, massive, and very prominent, and the entire infra-maxillary bone is greatly hypertrophied. The tongue is also greatly hypertrophied. The ears do not exhibit any constant alteration. The neck is short and thick, and in advanced cases there is well-marked kyphosis in the upper dorsal region; so that the head is sunken between the shoulders. The thyroid gland is usually small, but never absent. The thorax is enormous, especially in its antero-posterior dimensions, and flattened laterally; the ribs are hypertrophied and very oblique, and the sternum projects very prominently forward in its lowest part. On deep inspiration the lower part of the thorax moves forward in a very peculiar manner. The scapulæ and also the pelvis are hypertrophied. The joints are in general prominent, and frequently the seat of pain and cracking on motion. The muscles in the early stages are hypertrophied, exhibit an augmented electrical excitability, and later become atrophic. Headache is usually a prominent symptom and the senses of sight and hearing more or less impaired, the skin flabby and dry and the hair coarse, the larynx is generally enlarged, and the voice loud and deep. The desire for food and drink is in most cases abnormally great, and the quantity of urine eliminated increased. The heart is usually hypertrophied and venous dilatation (varices and hæmorrhoids) often present. The sexual desire is, as a rule, diminished or absent, and menstruation ceases early in women. The psychical functions are not usually impaired. The abnormal growth generally commences between the ages of 20 and 26 years, develops slowly, and has

a duration of 20 to 30 years. Its causes are unknown, and it does not attack one sex more than the other. The pathological anatomy of acromegaly has been but little investigated. The bones of the extremities and the extremities of the bones are especially involved. Three pathological changes are probably constant; these are, hypertrophy of the pituitary body with dilatation of the sella turcica, the persistence of the thymus gland, and the hypertrophy of the fibres and ganglia of the sympathetic system. Microscopic examination of the hypertrophied organs reveals a simple hypertrophy.

Marie ⁴⁷_{July} reports another case of acromegaly and appends a general description of the disease, which is for the most part a repetition of that already published. ⁷³_{Mar. 16} He appends a complete bibliography with valuable comments. By far the most complete work on acromegaly is that of Marie. ⁴⁵²_{Sept. 78 to Dec. 79} In it he collects all cases and autopsies of the disease that have been published, and republishes them with illustrations and with comments. The series of articles is not yet finished, and his conclusions cannot yet be given. It is from this article that the figures in the plate shown herewith have been taken. The figure of the man is the case reported by Fritsch and Klebs, ¹⁰¹⁶₇₄ and shows clearly the characteristic alterations in the hands, feet, and thorax, and yet in this case there is some doubt as to the diagnosis, Virchow regarding it as probably a case of osteitis deformans. The figure of the skeleton is taken from that of the case reported by Brigidi, and shows clearly the characteristic enlargement of the bones of the hands and feet, the kyphosis, and deformity of the thorax. Broca describes ³⁶⁰_{Dec. 78} the skeleton of one of the original cases of acromegaly reported by Marie. The principal change found was an hypertrophy and increased porosity of the spongy portion of the bones of the extremities and enlargement of the channels containing blood-vessels. There were also exostoses at the articular extremities of the bones. The inferior maxillary bone was greatly hypertrophied, and all the sinuses in the bones of the skull were dilated. There was a kyphoscoliosis in the dorsal region of the vertebral column.

Freund ⁴⁰⁴_{Nov. 1889, 1890} describes in detail a typical case of acromegaly which has been under observation many years, and gives photographs of it. He discusses at length the rapidity of the growth of various parts of the body at different ages and periods of de-



Acromegalia (Marie).
Nouvelle iconographie.

velopment, and says : "Acromegaly is an anomaly in growth, which, probably beginning at the period of second dentition, advances actively at the period of puberty, and consists in a rapid growth—far exceeding physiological limits—of the bones of the face, especially of the lower jaw, and of the extremities and their respective shoulder and pelvic girdles, with only secondary changes in the bones of the cranium and trunk. As in the case of dwarfs and giants, so even more in acromegaly the sexual functions are involved ; and it is certain that in all well-developed cases of acromegaly in which this matter has been investigated the sexual function is extinguished."

In an address before the Berlin Medical Society, Virchow⁴ exhibited a living case of acromegaly and the skeleton of a case reported last year by Fräntzel.⁵ In the case of the man exhibited, the abnormal growth commenced insidiously, probably in youth. He is married and has had six children, and in this connection Virchow criticises unfavorably Freund's hypothesis that there is a connection between the development of the sexual life and the origin of acromegaly, and thinks it more probable that the condition depends rather on hereditary influences. The man has also wonderfully developed muscles, and, what is somewhat unusual, he can use his large muscles powerfully and actively. The skin and subcutaneous tissues are also abnormally thick, so that there is some resemblance to myxœdema (but in myxœdema the bones are not enlarged, and they always are in acromegaly). Acromegaly may be considered a partial giant growth, but it differs very essentially from the latter. The length of the foot (which has always been an important measure, and to which as a basis we refer all measures) is normally one-sixth the length of the body. In three giants mentioned by Virchow, the body was 6.3, 6.7, and 7.1 times as long as the foot, while in the man with acromegaly the body is only 5.8 times as long as the foot. This man's head is enormously large, but the lower jaw is not relatively more hypertrophied than the other parts. The hands, feet, fingers, and toes are greatly enlarged. There is no sternal dullness corresponding to a thymus gland. In the autopsy of Fräntzel's case there was no thymus gland, and the thyroid and pituitary glands appeared normal. The skeleton showed the usual hypertrophied bones of the hands, feet, etc., and many of the bones presented osteophytes in such a

manner as to point to some connection between acromegaly and osteitis deformans.

Adler¹⁵⁰ reports the first case of acromegaly published in America. The patient was a woman aged 34 years, born in Germany, with no hereditary taint, in whom the disease began to make its appearance in her hands very insidiously in her eighteenth year without any assignable cause. Menstruation commenced at the age of 15, was scanty and irregular, and ceased at the age of 18. Married at 20, but never pregnant. There was a very general hypertrophy of the bones throughout the body, certain ones being especially hypertrophied. The bones of the head all seemed thickened and enlarged, especially the lower jaw and the occipital protuberance. The ribs were all enlarged, and there was an extreme kyphosis. The bones of the pelvis seemed thickened, as did also the bones of the arms and legs, and, above all, the bones of the hands and feet. The skin was everywhere abnormally thick, and the tongue was larger than normal, while the muscles throughout the body were somewhat atrophied. There was a general enlargement of the lymphatic glands throughout the body, but no percussion dullness corresponding to a thymus gland. The patient showed signs of mental weakness. The case is reported with great care, and the author gives the measurement of the various hypertrophied parts.

Erb³²⁶ contributes a case of acromegaly, and a clinical picture of this disease based upon all the published cases. He found in 3 cases dullness on percussion in the upper sternal region, which he attributes to the persistence of the thymus gland. Schulz⁷⁵ reports 2 cases of acromegaly, 1 of which was associated with arthritis deformans. The other case had a remarkably large head, larger even than that in the case reported by Virchow. The first symptoms in this case were disturbances in vision ten years ago, which in the course of five years developed into complete temporal hemianopsia. At the time the case was reported the patient was completely blind in one eye and nearly so in the other, so that it was probable that a tumor of the pituitary body was present. In this case the thyroid gland was not enlarged, but there was faint, though unmistakable, dullness over the manubrium sterni.

Strümpell⁸⁴ reports a case of acromegaly in a woman, aged 29 years, who, in addition to the usual symptoms, suffered from

diabetes mellitus and profuse sweating, and presented a number of symptoms, such as mental depression; neuralgic pains, anæsthesia, analgesia, etc., which indicated a nervous origin for the condition. Minkowski⁴_{Nov. 21, '97} describes a case of this disease which differed from the ones originally described by Marie in that there was no polyuria nor polydipsia. Farge⁷³_{July, '98} reports a case of acromegaly in a man aged 31 years, in whom the condition commenced about the age of 19 years. His head is enormous, especially the facial portion and the inferior maxilla. His hands and feet are very large, and in them the hypertrophy first appeared. There is a well-marked kyphosis. The soft parts are enlarged as well as the bones, and this is especially marked in the ears, nose, lips, etc. Ewald,⁴_{Mar. 15} Godlee,²_{Apr. 21, '98} and Hadden²_{Apr. 21, '98} each report a case of acromegaly.

NEURALGIA.

Etiology.—Lyman²⁸¹_{Apr.} publishes an interesting lecture on the causes of neuralgia. Among the predisposing causes he considers in turn heredity, age, sex, and anæmia, and among the exciting causes he classes cerebral overwork and cerebral overexcitement, heat and cold, intoxication, whether from organic or inorganic substances, from products of fermentation, from microbes and the ptomaines which they produce, or, finally, from poisons of auto-genetic origin, as occur in rheumatism, gout, uræmia. In connection with Lyman's paper, Brower²⁸¹_{Apr.} publishes an article on the differential diagnosis of the various forms of neuralgia. Marshall⁶_{Nov.} reports an interesting case of neuralgia of the upper lip which was due originally to the irritation of a broken tooth, and which was finally relieved by a section of the nerves and of a small patch of diseased mucous membrane.

Neuralgia and Psychoses.—Anton⁸_{Mar. 21} reports 2 cases of supra-orbital neuralgia (in persons predisposed by heredity to nervous affections) complicated with epilepsy and insanity. One case was cured and the other very greatly improved by electrical treatment of the neuralgia. Anton refers the epilepsy and insanity in these cases to changes in the cerebral circulation due to the action of the central origin of the trigeminus on the neighboring vasomotor centre in the pons and medulla. If his reasoning were correct we should expect to find the combination of trigeminal neuralgia and insanity much more commonly than is actually the case.

Neuralgia and Abortion.—Napier³⁶ publishes an interesting paper on this subject. Among his conclusions are the following: 1. Neuralgia and abortion are frequently associated. 2. In certain cases of "habitual abortion" neuralgia invariably manifests itself as the first symptom, attacking cranial or spinal nerves remote from the uterus. 3. Foetal death is sometimes the evident cause; sometimes evidently results from the reflex irritation associated with the neuralgic pain. 4. The trifacial, occipital, and cervical nerves are most commonly affected, but brachial, intercostal, lumbar, and sciatic neuralgias are also met with. In this connection may be noted Allport's⁶¹ paper on the subject of trigeminal neuralgia consequent upon pregnancy.

Treatment.—Most of the publications during the year on the subject of neuralgia have related to the treatment of this painful affection. Weiss¹⁰⁹ publishes a rather elaborate article on the treatment of sciatica. In cases of secondary sciatica the treatment must be directed against the cause, which usually consists of some abnormality within the pelvis. Tumors or foreign bodies pressing on the nerve must be removed, fractures reduced, scars excised, and in cases of venous congestion laxatives should be given, or blood withdrawn from the anus or perinæum. In cases of syphilitic sciatica 30 to 80 grains (2 to 5.25 grammes) of iodide of potassium should be given daily. In cases of rheumatic sciatica an active diaphoresis once or twice at the outset of the disease is of great value, and 30 to 90 grains (2 to 6 grammes) of salicylate of sodium should be given in the course of two or three hours, and if this is rejected by the stomach it should be given by enemata in somewhat larger amounts. In most cases active diaphoresis and the treatment of salicylate of soda will lead to perfect recovery in the course of a couple of weeks. In case the stomach becomes intolerant to the salicylate of soda, the salicylate may be given in smaller doses, combined with antipyrin, 10 grains (0.7 gramme) of which can be given from three to six times daily, or phenacetine may be substituted for antipyrin. In cases of idiopathic sciatica counter-irritation plays a great part. This can be applied along the course of the nerve or over the tender points in the form of blisters, or the actual cautery or irritating plasters, or mustard-plasters, or the methyl-chloride spray. One of the most satisfactory methods of counter-irritation is the electric brush,

applied along the course of the nerve. The most important place among the measures for treating sciatica is occupied by electricity, especially the galvanic current. The galvanic treatment can be aided by the use at the same time of warm baths. Carpenter⁶¹_{Sept. 14} and Jaccoud¹⁵²_{July 13} publish interesting and valuable summaries of our knowledge of sciatica, and the former devotes considerable space to the consideration of the surgical treatment of this affection. Hurd⁷⁶⁰_{Nov. 16} gives a complete and instructive article on the treatment of neuralgia in general.

Hunt⁶¹_{Sept. 28} reports 5 cases of obstinate sciatica, in which he obtained a cure by means of rest, suspension, and extension of the leg. These three, in his opinion, cardinal factors in the successful treatment of sciatica, he secures by the application of the Hodgen splint, and of this splint his paper contains a wood-cut. Taylor⁹_{Apr. 6} has had good success in treating sciatica by a peculiar kind of massage, which consists in rolling a glass rod about $1\frac{1}{2}$ inches (3.75 centimetres) in diameter and 2 feet (61 centimetres) in length slowly and firmly along the course of the nerve. Ziehl⁴_{Nov. 11} reports a case of obstinate trigeminal neuralgia permanently cured by the application of electricity in the following manner: Electrodes of 25 cubic centimetres were applied to each side of the head (the positive pole on the painful side) and a galvanic current of $1\frac{1}{2}$ milliampères was allowed to pass for an entire hour every day for a fortnight. Macquart¹⁵²_{Feb. 16} had a case of facial neuralgia promptly cured by the spray of chloride of methyl, and by tampons moistened with chloride of methyl and applied to the mucous membrane of the lips. Bouvard¹⁰⁸_{Apr. 16} states that he cured an obstinate case of sciatica in himself by the external application of sulphur three times, and that ten days afterward an abundant eruption of acne covered his face and body, which he subsequently found by further experimenting was due to the sulphur. Solis-Cohen⁹_{Apr. 6} reports a case of sciatica in which a great variety of treatment, including nerve stretching, had been tried without affording relief. It was finally cured by repeated injections near the nerve of from 10 to 20 minims (0.6 to 1.2 cubic centimetres) of a 1-per-cent. solution of osmic acid. Bauduy⁸²_{Aug. 21} reports 2 cases of obstinate neuralgia which were promptly cured by subcutaneous injections of $\frac{1}{2}$ grain (0.03 gramme) of theine. Stewart¹⁴⁹_{Jan.} speaks highly in praise of hypodermic injections of ergot in cases of facial neuralgia. He uses the plain extract

in solution, 1 minim (0.06 cubic centimetre), representing 2 grains (0.13 gramme) of ergot. Of this solution he injects 8 to 12 minims (0.5 to 0.75 cubic centimetre) blood warm into the temple, as nearly over the seat of pain as convenient. Sturgis⁵¹ testifies to the value of ergot in the recurrent headaches of children. He prescribes 10 minims (0.6 cubic centimetre) of the fluid extract of ergot, generally alone, sometimes with iron, and perseveres in its use at least for two weeks after the disappearance of the headaches. Covarrubias⁵⁷⁸ reports a case of rebellious sciatica quickly cured by antipyrin in 8-grain (0.5 gramme) doses three times a day. O'Donovan, Jr.,¹⁰⁴ cites a number of cases of neuralgia in his practice in which the use of acetanilide gave great relief, and Taylor¹⁴⁹ testifies to the value of aconitia in neuralgia.

Frey¹¹³ reports the case of a man aged 28 years, without any hereditary predisposition, suffering from typical tic douloureux, which had resisted a great variety of treatment, who was cured by hypnotic suggestion, and Bybring⁵⁷ also reports a case of supra-orbital neuralgia cured by hypnotic suggestion; while Luys¹⁰⁰ cites a case of severe dental neuralgia, in which the teeth had been extracted and many remedies tried without benefit, and in which a complete cure was effected by eight treatments with rotary mirrors.

Neurectomy for the Relief of Neuralgia.—Nicoladoni⁵⁷ describes a number of interesting cases of neuralgia. Two of these, both cases of infra-orbital neuralgia, are especially interesting, the infra-orbital nerve having been resected with temporary relief of the pain. The pain having returned, the infra-orbital nerve was again exposed, and in its place was found in each case a hard, round cord, the removal of which afforded entire relief from the pain. A microscopical examination of this cord showed that there was not a simple regeneration of the nerve, but a new formation of the nervous tissue in the form of wavy interlacing bundles of nerve-fibres inclosed in thick, cicatricial connective tissues, presenting an appearance very similar to sections of neuromata following amputation.

Andrews⁶¹ publishes a paper, in which he comes to the conclusion that repeated operations at the same point of the nerve are of great value in relapsing cases of neuralgia, that they are not dangerous nor exhausting, and afford a patient a relief which, by

some repetitions, will often make him entirely comfortable for the remainder of his life.

Magruder⁹_{Oct. 12} reports 2 cases of facial neuralgia in which complete relief was obtained by the excision of a large portion of the affected branch of the fifth nerve. The cases are reported too soon after the operation to make it certain that the cure is a permanent one.

CEPHALALGIA AND MIGRAINE.

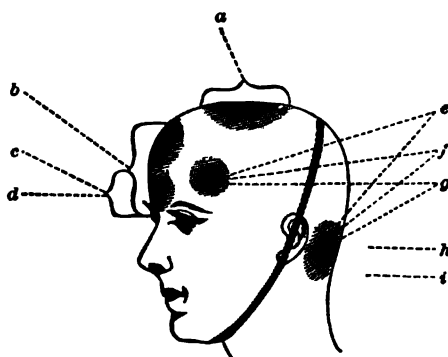
Cephalalgia.—The most valuable contribution to the subject of headache, during the past year, is that of Dana,⁹_{Mar. 16} which is based on an analysis of 200 cases of functional, non-migrainous headaches. As regards its pathology headache is, strictly speaking, a form of neuralgia. It has a diffused character, owing to the part of the nerve involved. The seat of headache is the external envelope of the skull and the dura mater, the skull being involved in rare cases only. The nerves affected are: (1) the trigeminal, which supplies the face and scalp as far back as a vertical line through the vertex and the dura mater of the anterior three-fourths or more of the cranial cavity; (2) the four upper cervical nerves, which supply the posterior scalp and neck; and (3) sensory branches of the vagus, which supply the posterior fossa of the skull.

There are three types of head pains, viz., headache, neuralgia, and migraine. Headaches are caused, as a rule, by diffused irritations located in or referred to the peripheral ends of the trigeminal nerves. Neuralgias, on the other hand, are caused by irritations of the trunks of these nerves. The cortex itself may, perhaps, be the seat of a headache, but then it is a psychical pain and of the nature of an hallucination. Migraine is a periodical neurosis in which there is a discharge of nerve-force, not only affecting the trigeminus, but often other cranial nerves as well as sympathetic fibres.

In reflex or, strictly speaking, transferred head pains the irritation is shunted off or diffused over from the original irritated nerve upon the central tracts of the trigeminus, or cervical or vagal nerves. The explanation of this is easy: The trigeminal nerve has central tracts which very easily awaken sensations in consciousness. The innumerable excitations of this nerve have broken a broad pathway to the cortical areas. On the other hand, the vagus branches to the stomach, for example, cannot by stimu-

lation so easily arouse conscious sensation; the nerve impulses started in it by an undigested bolus of food, therefore, pass to the medulla, and then, flowing over, take the easier path to the cortex, viz., that of the first branch of the trigeminus, and the patient has frontal headache.

Chronic and recurrent headache is always a symptomatic trouble. We know of no such thing as essential or idiopathic headache aside from migraine. Its study, therefore, is naturally limited chiefly to the subject of etiology and treatment. Headache belongs still more than neuralgia to women. The headache ages are from 10 to 25, and 35 to 45; most cases occur between the ages of 8 and 25, especially in females. The exciting causes



ETIOLOGICAL HEADACHE SPOTS.
(*Medical News.*)

a, anæmia, endometritis, bladder; b, constipation, caries of incisor; c, error of eye-refraction; d, gastric dyspepsia; e, eye; f, decayed teeth; g, pharyngitis, otitis media; h, uterine; i, spinal irritation.

are: 1. Hæmic causes, in which impoverished or poisoned blood is brought to the brain, as in (a) anæmia; (b) diathetic states (gout, rheumatism, diabetes, etc.); (c) infections (malaria, syphilis, etc.); (d) uræmia. 2. Toxic causes (lead, alcohol, tobacco, etc.). 3. Neuro-pathic states (epilepsy, neurasthenia, chorea, hysteria, and neuritis). 4. Reflex causes (ocular, naso-pharyngeal, auditory, dyspeptic, and sexual-uterine). 5. Organic disease.

The relative frequency of the different forms of headache is as follows: Hæmic and toxic forms 35 per cent.; dyspeptic reflex 25 per cent.; other reflex 10 per cent.; neurotic 20 per cent.; organic 5 per cent. Of the typically reflex headaches the ocular rank first, while but few are due to nasal or aural irritation.

In regard to the location of headaches, roughly speaking, we have: 1. Frontal headaches. 2. Occipital headaches. 3. Parietal and temporal headaches. 4. Vertical headaches. 5. Diffuse headaches and various combinations of the above. From his investigation Dana thinks that the most general rule which one can formulate is that headaches from refractive errors are usually frontal or orbital; those from muscular insufficiencies are more

often occipital and cervical; while naso-pharyngeal and those from nasal inflammations and hypertrophy are dull frontal or diffuse.

The accompanying-plate shows the seat of headaches as determined by the etiological factor causing them.

Symptomatological Classification.—The term *headache* means a different thing with different persons, and in different types of the disease we have: 1. Pulsating, throbbing headache. 2. Dull, heavy headache. 3. Constrictive, squeezing, pressing headache. 4. Hot, burning, sore sensations. 5. Sharp boring pains. The first form characterizes headaches with vasomotor disturbances and usually indicates migraine. The second is a toxic dyspeptic type. The third is found in the neurotic and neurasthenic. The fourth, in rheumatic and anæmic cases. The fifth, in hysterical, neurotic, and epileptic cases.

Therapeutics.—The treatment of headaches of young children brings us into an almost special line of cases. In the city of New York, at least, these headaches are best treated, as a rule, by giving small doses of the iodide of iron or of the citrate of iron and quinine. In school-children headaches have often to be treated by removal from school, the use of tonics, change of diet, and the application of glasses suitable to any eye-defects that may be present. But glasses should be the last thing tried, unless the visual trouble is very marked. In some children arsenic acts well.

Headaches among brain-workers require, as a rule, a different class of remedies to those among muscle-workers. In the former class nervines like antipyrin, caffeine, and the bromides act well; while attention to diet, exercise, and the eyes is especially required. Among the laboring classes, especially women, anæmia, malaria, syphilis, and rheumatic influences must often be attended to. Among the best of symptomatic remedies is muriate of ammonium in large doses, $\frac{1}{2}$ to 1 drachm (2 to 4 grammes), given in wafers. In the headache of neurasthenia, menthol, 5 grains (0.3 gramme) in hot water, gives relief, or a combination of menthol, 5 to 10 grains (0.3 to 0.6 gramme), and antifebrin in 5 to 10 grains. Phenacetin is also a good remedy. A practical point of importance in the use of antipyrin is the dosage. Often the best results are obtained by small doses frequently repeated. The much-advertised effervescent preparations for headache contain too small

a dose of caffen or of bromide to be of the best service. Of local applications, a spray or lotion of aconitia, sheet-lint soaked in 20-per-cent. solution of menthol and wrapped on the head, solutions of cyanide of potash after the method of Trousseau, and Rithet's tobacco and quinine snuff are some of the measures indicated.

Every one meets now and then with cases of headache of obscure origin, obstinate in character, and intractable to every kind of treatment. The use of iodide of potassium and of the strong galvanic current and static electricity has been of service to Dana in some such cases.

Schnetter,¹⁵⁰ in a long article on headache, supports the view that nervous headache is a neurosis due to an irritation which originates from some pathological condition in the nasal cavity, is reflected to the cervical sympathetic ganglia, and in consequence causes circulatory disturbances in the head. The first and second branches of the trigeminal nerves are most frequently the seat of the pain because of their intimate connection with the cavernous sinus. Jones¹⁵ publishes an article on the diagnosis and treatment of headaches, in which he divides them into two classes, one with diminished, the other with increased, general blood-pressure, and treats them accordingly. Ranney,⁵⁹ after mentioning the fact that some underlying cause is present in cases of headache and neuralgia, tabulates 50 consecutive cases of this kind treated exclusively by the correction of eye-strain. Lewis,⁹ reports a number of cases of headache in which the oil of eucalyptus in 5-minim (0.3 cubic centimetre) doses every four hours gave prompt relief, and states that Weir-Mitchell and Sinkler have employed the drug in like cases with benefit.

Migraine.—Nestel,³⁶⁸ considers that the essential condition in migraine is an alteration in the blood-supply of more or less of the cortex of one cerebral hemisphere, and explains from the same cause the cerebral symptoms, such as hemianopsia, scotoma, etc., which often complicate migraine. Among the etiological factors in migraine he dwells especially on a change in the quality of the blood, and among the symptoms he notes an increased excitability and diminished resistance of the affected side of the head to the galvanic current. In regard to treatment Nestel advises for the constipation usually present a daily dose of some bitter water, as Hunyadi, etc., before breakfast; for the general muscular weak-

ness he advises properly-regulated exercise, especially walking, at first short distances, then longer, till the patient takes two long walks daily. After the walk he recommends the drinking of hot water. The abnormal condition of the blood frequently present in migraine must be treated by iron, etc., and a sovereign means for the treatment of migraine exists in electricity properly applied. In the case of plethoric individuals the galvanic current is the one to use, but in certain cases it is impossible to say whether the galvanic or the faradic current should be employed, and in such cases Nefel commences the treatment with the daily application of a moderate galvanic current, the negative pole on the nape of the neck and the positive slowly moved over the forehead, eyes, and face, with an occasional reversal of the current. If improvement does not occur in a week's time the faradic current is used, the negative pole on the nape of the neck, the positive either on the epigastrium or moved about the anterior and lower part of the neck, the force of the current being slowly increased and decreased.

In an appendix Nefel recommends this same plan of treatment—viz., exercise in the open air, followed by the drinking of hot water—and galvanization of the brain in chronic neuroses and psychoses, such as hysteria, melancholia, neurasthenia, epilepsy, etc.

Goubert³⁴⁵ reports good results in the treatment of migraine by $\frac{1}{10}$ grain (0.003 gramme) of bromide of gold well diluted in water, given during the attack and repeated in an hour if necessary. Given between the attacks in doses of $\frac{1}{10}$ grain twice a day it acts as a prophylactic.

Overend⁷ publishes an interesting paper on migraine based on his own sufferings from this disease, and Nothnagel²² publishes an interesting lecture on this subject.

Migraine Complicated with Cerebral Symptoms.—Berbez¹⁵² reports a very interesting series of 10 cases (including that of himself and of his brother) of migraine accompanied with cerebral symptoms of a varying nature (the “migraine accompagnée” of Charcot). The “migraine accompagnée” is certainly a symptom of great importance. It is a concurrence of signs indicating that a portion of the brain functionates badly, due probably in most cases to an arterial spasm. But it is not improbable that in consequence of the repeated local spasm, local lesions, such as a pachymeningitis, for example, may result. The cerebral symptoms

vary greatly in different cases and in the different attacks of the same case, and are of such intensity and severity that it is at first difficult to realize that they are of a temporary nature and not dependent upon organic disease of the brain. This form of migraine is usually hereditary, and very frequently the attacks are directly occasioned by ocular fatigue. The attacks in most cases are not frequent, occurring once every two or three months, and their duration is short.

The great variety of the cerebral symptoms complicating the migraine is shown by a short abstract of the 10 cases:—

Case 1. Attacks of migraine, not very painful, but accompanied sometimes by concentric retraction of the field of vision, sometimes by aphasia, sometimes by hemianopsia superior, and sometimes by a numbness of an arm.

Case 2. Migraine not very severe, but accompanied sometimes by vertigo, sometimes by aphasia and agraphia, and sometimes by concentric retraction of the field of vision.

Case 3. Migraine severe and accompanied by scintillating scotoma and right-sided numbness and hemiparesis.

Case 4. Migraine accompanied by left-sided hemianopsia, hemianæsthesia hemiparesis, and a slight aphasia.

Case 5. Migraine without headache, but with amblyopia and numbness of right side.

Case 6. Migraine accompanied by left-sided hemiparesis and hemianæsthesia and scintillating scotoma.

Case 7. Migraine accompanied by difficulty of speech, numbness of right half of body, and amaurosis of the right eye.

Case 8. Migraine accompanied by aphasia, agraphia, numbness, and weakness of right arm.

Case 9. Migraine accompanied by aphasia, hemianopsia, and epileptiform convulsions.

Case 10. Migraine accompanied by aphasia and numbness of the right arm.

In cases 8 and 9 there was probably a localized cortical lesion of syphilitic origin, the symptoms of which disappeared under antisyphilitic treatment.

RAYNAUD'S DISEASE AND OTHER VASOMOTOR DISTURBANCES.

Raynaud's Disease.—Collier⁹⁰ describes an interesting case

of Raynaud's disease occurring in a woman 20 years of age, who presented a number of paroxysmal attacks of pain, pallor, coldness, numbness, and anæsthesia of the extremities. All these symptoms were most marked in the fingers and toes, and after an especially severe attack the toes of the left foot became gangrenous and subsequently sloughed. All the attacks were accompanied by severe abdominal pain. Patient gradually became more and more collapsed and died. At the autopsy there were found the lesions of an old peritonitis and 8 ounces (236 cubic centimetres) of pus lying in the neighborhood of the celiac axis. With this exception no characteristic lesions were found, and the spinal cord and peripheral nerves appeared healthy both to macroscopic and microscopic examination. Collier thought it probable that the irritation of the great abdominal sympathetic system was the cause of the arterial spasm which determined the paroxysmal symptoms in the extremities and the gangrene of the left toes, and he regards all cases of this well-marked disease as falling into one of the following groups:—

1. Those due to direct stimulation of the peripheric ganglia. In this group are the cases of gangrene dependent on vascular spasm, produced by some altered condition of the blood. Of course, in these cases the production of gangrene will be partly due to malnutrition of tissue and partly to the action of the blood on the higher cerebro-spinal centres, as in cases of paroxysmal hæmoglobinuria. The gangrene of Bright's disease and of diabetes mellitus will be, to some extent, produced in this manner. The vasomotor symptoms in alcoholic paralysis are probably also due to the circulation of impure blood.

2. Those due to irritation of the prevertebral sympathetic ganglia, or vasomotor nerves leaving them, as in the case recorded above. Probably pathological conditions of the large abdominal sympathetic ganglia are much more common than is usually suspected, especially in anæmic girls of the age generally attacked by Raynaud's disease.

3. Those due to irritation of central origin, as in a case of gangrene of the left hand recorded by Hochenegg, where chronic hydrocephalus and syringomyelia were found at the post-mortem. Cases due to emotional origin would come into this group.

4. Those due to some peripheral stimulation acting reflexly

through cerebro-spinal centres. Thus, cutaneous sensory nerves irritated by cold, or, in cases of symmetrical gangrene, from scleroderma. Here again part of the action of peripheral neuritis in producing arterial spasm will be produced in this manner.

In the cases of the disease associated with syphilis, congenital or acquired, it is difficult to be positive that endarteritis, or some other arterial degeneration, has not been the main cause.

Curtis,² reports the case of a man, aged 28 years, who, on July 10th, received a severe blow with a capstan on the abdomen. On August 4th he was admitted to the hospital at the Cape of Good Hope suffering from gangrene of the lower extremities, the line of demarcation being well marked in each by an irregular ring from 4 to 6 inches (10 to 15 centimetres) above the malleoli, a condition necessitating double amputation, from which the patient made a good recovery. The *rationale* of the process of the gangrene set up simultaneously in both feet after a blow on the abdomen is not self-evident. The man had rather a weak pulse, but the heart-sounds were normal; he was a native of the tropics, entering suddenly into a temperate and comparatively cold climate, and was liable to chilled feet by his occasional occupation, namely, washing clothes on a lead flooring, and these circumstances may have predisposed to blood stagnation in the extremities. But the efficient cause of the gangrene was plainly the severe blow on the epigastrium, and the subsequent chain of events seems to have been shock of the sympathetic system through the sudden contusion of the solar plexus and splanchnic ganglia, etc. (analogous to concussion of the brain or spinal cord), relapsing syncope of the heart, with general vasomotor paralysis and stasis of blood in the remote vessels. The blockage of the tibial vessels seems to have been too great for the returning circulation, and local death ensued.

Fox,⁶ writes in support of the view that Raynaud's disease is due exclusively to an arterial spasm, and that the peripheral neuritis frequently found in such cases is secondary and not primary; while Rake,⁶ describes a case of leprosy, complicated with Raynaud's disease, in which the peripheral neuritis was evidently primary and the Raynaud's disease secondary. Bramann,¹¹³ observed 3 cases of symmetrical gangrene occurring in brothers. The disease in these cases was evidently of nervous origin, and other nervous symptoms, as anæsthesia and analgesia, were

present. It is very probable, as von Bergmann stated in the discussion following the report of the case, that these are cases of *lepra nervorum*.

Bland⁶ reports a case of an epileptic who was admitted into the asylum suffering from an attack of acute mania. He would not stay in bed, standing for whole nights on the floor in his bare feet. His mental condition improved, but a fortnight later he had a relapse, and on the following morning, after spending a restless night, his feet were noticed to be swollen and he complained of great pain in them. The toes were of a bluish-purple tint, felt cold, and were slightly anæsthetic, the patient suffering severe pain in the anæsthetic regions. The pulsation in the tibial and dorsalis pedis arteries could scarcely be detected. Patient felt a sense of constriction all over his body, intense frontal headache, with severe pain of a spasmodic character in the lumbar regions and great tenderness in the region of the kidneys. In addition, there were several small hæmorrhagic extravasations on the buttocks and thighs. His vision was also materially affected. He complained of dimness of sight and inability to read. On ophthalmoscopic examination the fundus was seen to be unusually pale, while the vessels were blanched and almost indistinct. The urine was very scanty and of a smoky appearance; specific gravity, 1028; neutral in reaction; deposit of phosphates, albumen, and a large quantity of blood. Blood was also present in his expectoration. Three of the terminal phalanges of the right foot sloughed off, leaving a healthy granulating sore. His constitutional symptoms only lasted about a week; the pain in the back disappeared; blood was only observed in the urine and expectoration for three days and then quite disappeared. Vision was restored and the optic disks appeared normal. The toes have healed nicely, leaving very little deformity or inconvenience to the patient. In this case cold was evidently the exciting cause. The occurrence of paroxysmal hæmaturia was pointed out by Raynaud in his original description of the disease, and Barlow has also called attention to this point.

Porter⁶ details the case of a woman, aged 48, suffering from attacks of local asphyxia in both hands and feet, independently of exposure, sometimes three or four in a day, alternating with paroxysmal attacks of epigastric pain and vomiting, usually followed by slight jaundice. There was no hæmatinuria, though albumen,

as well as bile, had been present in the urine after an attack; but no reaction could be obtained with the guaiacum test. The local syncopic and asphyxial stages were usually well defined. The fingers sometimes became almost black, but no pain was complained of in the hands or feet during the attack.

Pasteur,⁶_{July}, reports the case of a boy, aged 9 years, who, after having been bitten in the leg by a dog, exhibited a number of attacks of Raynaud's disease, all of which commenced in, but were not limited to, the left hand. Pasteur says, "It is of interest to note, in connection with the reflex vasomotor neurosis theory of Raynaud's disease, that in the present instance there was a well-defined source of irritation in that part of the periphery which subsequently became the seat of the asphyxia."

Morgan,⁶_{July}, had a case of Raynaud's disease occurring in a syphilitic man which, on two occasions, yielded quickly to antisiphilitic treatment; so that in this case the symptoms of Raynaud's disease seemed to depend on the syphilis. The case is interesting in many respects, and on one occasion there was blood in the urine. To the report of this case Morgan appends a quite extensive critical review of this form of disease, based upon 93 cases which he was able to find in medical literature.

West,⁶_{Feb. 16}, describes a case of Raynaud's disease in which an erysipelatous eruption of the face appeared, followed by pneumonia and death. The radial artery, median nerve, and the medulla were examined microscopically and yielded no evidence of change. Warfvinge¹⁰¹⁷_{p. 128} reports a case of symmetrical gangrene with sloughing of all the fingers, and after death a careful microscopical examination revealed no change either in the spinal cord or in the peripheral nerves.

Cattle,⁶_{May 25} Wetherell,⁶_{June 20} Kingdon,²_{May 11} Tannahill,²¹³_{Dec. 78} Totsuka,²⁰⁰_{June} Waldo,¹⁸¹_{Dec. 78} Gibson,³⁹_{June 17} Garland,⁵⁹_{June 20} O'Connor,²_{Mar. 16} Beevor,²_{Mar. 20} and Massy,¹⁸⁸_{Apr. 21} report cases of Raynaud's disease, while Macpherson's¹⁰⁸_{Apr.} interesting case of acute mania, with symmetrical gangrene of the toes, has already been reviewed at length.⁶⁷³_{May.}

Morvan's Disease.—Gombault¹⁰⁰_{Apr. 30} reports a case of Morvan's disease (paréso-analgésie), with autopsy. The patient, a woman aged 56 years, had been troubled since the age of 12 years by a number of attacks of this disease in both hands, which had caused extensive mutilation of the fingers. The skin and muscles of the

hands exhibited many trophic disturbances, and the sensibility was much impaired. At the autopsy there was found an increase in the connective tissue, with degeneration and, in many cases, complete disappearance of the nerve-fibres in the nerves of the arm. These changes were most intense in the periphery of the nerves, and became less marked in the large trunks. In the cervical region of the spinal cord there was a mild degree of sclerosis of the posterior columns and of the posterior horns. The changes in the peripheral nerves were intense, and those, in the spinal cord, slight.

Angioneurotic Oedema.—Smith⁹ cites 4 interesting cases of angioneurotic oedema, and suggests two provisional classes of acute circumscribed oedema: (a) inflammatory—depending upon actual inflammatory processes in the papillary layer of the skin; (b) neurotic—depending rather upon an angiomatous condition of the lymph-vessels of the corium, due to alteration in the nervous supply. To this latter variety might be applied, for the purpose of clearer definition, the term *acute neurotic lymphangioma*. In the actual matter of treatment, too, there may be a clearer line of separation drawn between these two classes, the former depending largely for its alleviation upon local measures, the latter demanding general medication directed toward the removal of the systemic fault which is almost certainly present.

Widowitz,²⁰⁶ in addition to 1 case which he had previously published, describes 2 other cases occurring in boys. Both boys were anæmic: one was born with a decided neuropathic predisposition; the other was hydrocephalic, and had suffered from his third year from eclamptic fits. The disease manifested itself in both boys first when they were 6 years old, and was characterized by a marked oedema of the face and hands after exposure to cold. This oedema occurred in large, sharply-defined spots, which always disappeared after a short sojourn in a warm room. An examination of the boys revealed no disease of any internal organ. Widowitz also mentions the case of a girl aged 22 years, who frequently suffers from a swelling of the left eyelid, associated with a flow of tears. This occurs in a warm room and is of very short duration.

Krieger⁵³⁰ reports a case of angioneurotic oedema occurring in a young man aged 25 years, whose mother suffered from the same disease. The patient had never contracted syphilis, had not abused alcoholic drinks, and his heart, liver, and kidneys were

normal. The œdema, which was accompanied neither by heat, redness, nor fever, appeared from time to time in various regions (the arm, leg, back, breast, etc.), and the last time appeared in the face. The patient was found dead in his bed a few days after the œdema had appeared in the face, and at the autopsy the cause of his sudden death was found to be an œdema of the glottis.

SPASMODIC DISORDERS—INFANTILE CONVULSIONS.

Berg⁵⁰ divides eclampsia infantum into the three following classes: 1. Febrile or symptomatic eclampsia. 2. Reflex eclampsia. 3. Toxic eclampsia. He discusses the first of these varieties at length, and, regarding the convulsions as due to the high temperature, he directs his treatment against this cause by means of cold baths and antipyrin.

Love⁶¹ contributes an interesting article on infantile convulsions, in which he insists that the convulsion is a symptom, and not a disease, and that in each case its cause must be sought for and treated. The fever so commonly present must be combated by cold baths and doses of acetanilide, while chloroform is a remedy of great value for the prompt quelling of the spasm.

TETANY.

Stewart^{1018 5} makes a very valuable contribution to this subject. He reports the case of a man aged 40, who has been troubled during the past eight years with regularly-recurring attacks of tetany. He served as a soldier during the American civil war. Suffered at that time and subsequently from chronic dysentery and malarial attacks. For upward of ten years he has been troubled with diarrhœa. Patient is tall, emaciated, and anæmic. The first subjective symptom of his tetany is usually double vision, which is quickly followed by the characteristic contractions of the flexor muscles of the hands. Occasionally the flexors of the forearms and the adductors of the arms become spastic; muscles of the face almost constantly suffer, those of the lower extremities rarely. The affected muscles are the seat during the attacks of fibrillary twitching. The attacks often last several days (seven to twelve), unless terminated by the very free use of morphia. The galvanic irritability of the nerves is found to be greatly increased, also the mechanical irritability of both nerve

and muscle. Knee-jerks exaggerated during attack; absent in intervals. Oedema of the hands and arms, with herpetic eruptions, frequently to be seen after particularly severe attacks. The quantity of urine excreted during attacks is usually normal in amount, and contains urea and indican in great excess. Patient has been under observation for more than three years, and it has been noticed during the past two years that he is gradually becoming dull and apathetic. It takes him a long time to answer questions; he complains of general numbness; his face and lips are swollen,—symptoms closely resembling those seen in myxœdema.

Stewart divides tetany into four varieties: 1. Epidemic or “rheumatic” tetany, common in Europe, but extremely rare in America. The course is acute and favorable. 2. Tetany from exhausting causes, as lactation, diarrhœa, etc. Course is chronic and favorable. 3. Tetany from removing of the thyroid gland. Course generally is usually either quickly fatal or chronic and incurable. 4. A form of tetany occurring in cases of dilatation of the stomach. Generally fatal. Infantile tetany is excluded from the above divisions, as what is so frequently called tetany in infants is not that disease. No doubt true tetany may occur in childhood.

Experimental Tetany.—When the thyroid gland is removed from cats, dogs, or monkeys a condition very similar to the typical tetany of the human subject is observed, viz., fibrillary tremors and intermittent spasmodic contractions. Death usually follows in a week, and no changes can be found to adequately account for it. The fact that there is a great increase in the electric irritability of the nerves after the removal of the thyroid glands is strong evidence of the similarity of the tetany of man and animals. Of the many forms of muscular contractions seen in man in none, with perhaps the exception of cholera, do we find any marked increase of the electric irritability of the nerves and muscles.

Morbid Anatomy.—No changes that in any way can be considered characteristic have been described. All recent observers tend to confirm the conclusions of Schiff, that the tetany following removal of the thyroid gland is directly due to the loss of the gland, and that the thyroid in some way has a direct influence over the nutrition of the nervous system. It is difficult to explain

how causes so diverse in their operation as "rheumatic" influences, diarrhoea, pregnancy, lactation, and removal of the thyroid can induce similar symptoms. It appears probable that impoverishment of the nerve-centres is one of the main factors in its production.

Carpenter¹⁰¹⁸_{v.4} also publishes a very suggestive paper on the subject of tetany, in which he regards it, not as a primary disease, but as secondary to other diseases, especially to septicæmia. He reports a number of cases which tend to show that tetany is due to septicæmia, and argues that the increasing rarity of the occurrence of tetany is due to more successful treatment and the prevention of septic poisoning. The proof which Carpenter adduces in support of his views is hardly convincing in its nature.

Müller³⁰⁹ reports 2 cases of tetany associated with dilatation of the stomach, combined in 1 case with hour-glass contraction of the stomach. Both cases terminated fatally, and in 1 case the mortal attack immediately followed a percussion of the epigastrium. He considers that in these cases the tetany is caused reflexly by the disease of the stomach.

Smith,⁵¹_{June} Kahler,⁵⁷_{Nov. 10} and Wichmann¹⁰⁵⁹_{No. 51} publish interesting and complete articles on tetany, with report of cases, and Shattuck⁸⁹_{Apr.} gives a brief report of 1 case.

CHOREA.

Etiology.—Körner,⁸⁸⁶_{v. 31, No. 2} combats the idea that attendance at school can be considered as a cause of chorea, and maintains that it only manifests itself in those school-children who are badly nourished and in poor physical condition. In healthy children chorea cannot usually be produced either by overexertion in school or as a result of imitation of other choreic children. Demme¹⁰²⁰_{v. 4} reports a case of chorea which occurred on two occasions as a symptom of iodoform poisoning. The iodoform had been applied as a dressing to a wound, and, in addition to the chorea, there was headache, anorexia, insomnia, iodine in the urine, and other symptoms of iodoform poisoning. Colburn³⁰³_{Mar. 5} publishes a report of 54 cases of chorea, in 39 of which he found, on examination of eyes, errors of refraction. In 16 of the cases school-work was evidently a secondary cause of the first manifestation of the trouble, and a return to any work that required close application of the eyes would greatly increase the severity of the

spasms. In none of these cases has there been a return of the trouble after the patient had used the proper correction long enough to become accustomed to the new condition, though they have been placed under the same influences that had at former times precipitated more or less severe spasm. In none of the cases was it necessary to use additional treatment. The period of convalescence varied from one to four months. Rieder³⁴_{Aug. 27} reports a case of congenital chorea in an idiotic girl 25 years of age, the choreic movements having been present from the earliest infancy. Laquer⁶⁰_{Dec. 20, '98} observed an epidemic of chorea in a girls' school, but, as he himself points out, it was not a true chorea, but rather a hysterical, rhythmical, clonic spasm associated with hemiparesis and other hysterical symptoms.

Chorea and Rheumatism.—Herringham,⁶_{Jan. 15} in a discussion at the Royal Medical and Chirurgical Society, read a communication on the relationship of chorea to rheumatism, based on an analysis of 80 cases of the disease, showing that such a relationship did exist, although many other causes were also effective in the production of chorea. Garrod, in the same discussion, from an analysis of 80 cases in his practice, came to similar conclusions, these being indorsed by the other members of the society who spoke on the subject—Cheadle, Sansom, Sturges, Barnes, Mackenzie, and Lee. Cheadle⁶_{May 4} argues strongly in favor of an intimate connection between chorea and rheumatism. Debray²⁷⁶_{Feb. 20} reports 4 cases which show the intimate relationship existing between chorea and rheumatism. Bouchaud¹¹⁸_{Dec. '98} adds the interesting case of a girl, aged 3½ years, whose father had had a number of attacks of rheumatism, who was attacked by chorea, in the course of which developed an acute polyarticular rheumatism, and with the termination of this latter disease there suddenly appeared a paralysis of motion of both legs without any disturbance of sensibility. This paralysis continued about a month. Bouchaud appends an interesting discussion as to the nature of this paralysis, which he regards as of spinal origin, and cites analogous cases occurring in medical literature. Greenwood²_{Feb. 16} reports a case in which there followed one another, in immediate sequence, quinsy, acute rheumatism, and chorea, and during the chorea a distinct mitral systolic murmur developed. Eade²_{Mar. 20} contributes the case of a 17-year-old boy, previously healthy, who was attacked

by a general chorea. At the end of three weeks the choreic movements increased, and an attack of erythema squamosum and palpulatum associated with fever developed. This was almost immediately accompanied by an attack of acute articular rheumatism, complicated the next day with pericarditis and delirium, and two days later with endocarditis. Four weeks after the commencement of the chorea, the choreic movements and the rheumatism began to improve, and four weeks later the symptoms of the pericarditis and endocarditis had almost entirely vanished. Hagge discusses ⁶⁵⁰_{xxv. 4, 42, 78} the relationship between chorea, polyarthritidis rheumatica acuta, and endocarditis, and comes to the conclusion that chorea may occur in the course of an infectious disease, and that among such diseases polyarthritidis rheumatica acuta most frequently thus gives rise to chorea, but that every case of chorea does not rest on this rheumatic basis, which, on the contrary, is present only in a minority of the cases, and it is not permissible to simply refer a case of chorea to an attack of rheumatism which occurred many years previous. Chéron ¹⁷_{xxv. 27, 78} reviews the question of the relationship of chorea to rheumatism without coming to any certain conclusions. He testifies in favor of antipyrin in doses of 45 grains (3 grammes) daily in the treatment of chorea. Fry ⁸²_{xxv. 12} reports 15 cases of chorea, which tend to disprove any close relationship between chorea and rheumatism.

Pathology.—Powell ⁴⁷_{xxv. 12} describes 2 cases of acute chorea associated with insanity and terminating fatally. In the first case there was associated with the chorea rheumatism and heart disease: in the second case there was absence of both these diseases. Mental strain was clearly an important factor in the causation in both cases; the man was very anxious about a foot-ball match he was going to play in a short time before his illness began, and the girl suffered much anxiety on account of the non-appearance of her catamenia. Each had hallucinations of sight and hearing, and suspicion and irritability were marked symptoms in both. The brain and spinal cord in both these cases were examined by Handford ⁴⁷_{xxv. 12} who found scattered through the spinal cord, the medulla, and the pons "very numerous hæmorrhages from small vessels as well as capillaries, thromboses, and general dilatation of vessels." No definite alterations were detected in the basal ganglia, and the vascular changes were less marked in the motor cortex than in the

spinal cord. Handford thinks there is abundant evidence to show that "a widespread hyperæmia of the nervous system" is capable of producing all the active symptoms of chorea, and that the consequent thromboses and hæmorrhages will explain some, if not all, of the inco-ordination and motor weakness, and that this view of the etiology is supported by the pathological evidence. The share that is taken by the different portions of the nervous system in the production of chorea is still an open question. He is inclined to look upon the milder cases as resulting from an affection of the cord—the lowest evolutionary level, and the severe ones associated with mental disturbance or definite insanity as resulting when the same process spreads to the cerebral cortex—the highest evolutionary level.

Jakowenko⁶⁸_{Nov. 15, '98} reports the result of an examination of the brain of 6 persons who had died of acute delirium accompanied by pernicious chorea. In all the cases he found lesions in the nucleus lenticularis, especially in the globus pallidus. These lesions consisted in numerous masses of peculiar little bodies, of various forms and sizes, which were situated principally in the neighborhood of the blood-vessels, and which from their reaction to staining fluids appeared to be the result of hyaline degeneration. In cases in which these bodies were present in smaller quantities there were evident varicosities of the nerve-fibres, or masses of pigment and detritus. In one case the nucleus lenticularis was replaced by a mass of fat-cells. In other respects the brain was normal. In another case in which the patient died of acute delirium, unassociated with chorea, very few of these little bodies were found, and they reacted differently to staining fluids. As the result of his investigation, Jakowenko concludes that the choreic movements are caused by nutritive disturbances in the globus pallidus of the nucleus lenticularis. In consequence of the anatomical conditions of the circulation in this region, its nutrition and function can be interfered with by general disturbances of the circulation, and, therefore, the frequent appearance of chorea after articular rheumatism, endocarditis, and various psychical shocks can be explained.

Dana,⁶⁹_{Oct. 19} in an article devoted to a consideration of the pathological anatomy of chorea, in which he describes the results of a careful microscopical examination of the nerve-centres made

by him in a fatal case of this disease, comes to the conclusion that in chorea there are three prominent pathological conditions: an impoverished condition of the blood; an intense cerebral and spinal hyperæmia, not meningeal, but deeper in and apparently due to vasomotor paralysis; and a neurotic history.

Barbour ⁶²_{Feb. 14} publishes an article on chorea in which he endeavors to maintain the hypothesis that "in chorea there is an altered state of nutrition of the motor cells of the cerebro-spinal axis, by reason of which they lose in part their capacity for storing nerve-force and discharge themselves prematurely," and that "most of the causes of chorea fall under one or the other of the heads, qualitative or quantitative anæmia;" but he brings forward very little convincing proofs of the truth of his views, and his article is justly criticised by Mettler. ⁶²_{Mar. 1}

Garrod ⁶_{Nov. 28} suggests the possibility, as did Cheadle in the previous year, that chorea is due to an overgrowth of connective tissue in the nerve-centres analogous to the fibrous nodules found in so many tissues in cases of rheumatism.

Grosse ⁴_{Aug. 19} has collected 7 cases of chorea with endocarditis recurrens from medical literature, and reports 2 more cases of this rare condition, which occurred in 1885, in the clinic of Wagner, of Leipzig. He discusses all these cases at length, and argues in support of the view that chorea is due to minute emboli in the brain, especially in the optic thalami and corpora quadrigemina, the source of the emboli being recent vegetations or coagulated fibrin on the cardiac valves.

Mitchinson ⁶_{May 11} reports 2 cases of severe chorea which were not relieved by narcotics, 1 of them dying four and the other ten days after admittance into the hospital. In both cases there was a rapid and extreme rise of temperature during the two or three days immediately preceding death. Œdema of the brain and vegetations on the mitral valves were found in each case at the autopsy.

Chorea Associated with Other Nervous Symptoms.—Ségla ⁶⁸⁵_{Nov. 21, '88} publishes a very interesting study on the psychic disturbances associated with chorea. Rondot ⁷⁰_{May 13} reports 7 cases to show that paralyzes may precede, accompany, or follow chorea, of which they may be the only or the predominant symptom. The most common forms of these paralyzes are: a brachial monoplegia, a hemiplegia without participation of the face, a diffuse paralysis, a para-

plegia, and a paralysis of the soft palate. There is almost invariably an abolition of the tendon reflexes and an absence of trophic or sensory disturbances. These cases reported by Rondot cannot be considered as offering much support to his views. Cadet de Gassicourt¹¹⁸_{Oct.} cites several cases of chorea in which the weakness usually found in this disease was so severe as to amount to a decided paralysis. Souza-Leite and Cherbuliez⁷³_{May 11} report 3 cases of chorea complicated by a paralysis of both legs. The nature of the paralysis in these cases is doubtful, although in 1 it is probably hysterical. Gay⁴⁷_{July} describes the case of a boy who, after a severe fright, became weak and shortly after completely paralyzed without at any time exhibiting muscular twitching; he also became emotional, mischievous, bad-tempered, and finally delirious, rambling incoherently. He made a continuous and complete recovery under the use of tonics, and when the power returned to his arms and legs his movements were performed "in that circuitous and irregular manner so characteristic of chorea." The case seems to be rather hysterical. Smith,²_{July 6} and Moricourt³²⁷_{Apr. 16} each describe cases of choreic movements associated with such a variety of hysterical symptoms as to justify the name of hysterical chorea.

Chorea of Pregnancy.—Ruheman,¹⁰¹⁹_{Apr.} after a consideration of the relation of chorea to pregnancy and of the etiology and prognosis of this form of the disease, reports in full 5 interesting cases of it. Handfield-Jones,²_{July 11} publishes a paper in which he attributes the chorea of pregnancy to an unstable condition of the nervous system, which is always present in the gravid constitution, of which it forms an integral part.

Senile Chorea.—Anders⁶¹_{May 16} reports an interesting case of senile chorea which did not improve under treatment. Tissier⁷_{Feb. 3} reports a case in a woman, aged 79 years, which developed a year after the violent death of her son, and which terminated fatally at the end of 14 months. At the autopsy there was found a superficial softening of the cortex of both occipital and of a portion of the left frontal lobes. It is not very probable that this cortical softening had any direct connection with the chorea. Nixon¹⁶_{May 1} contributes a case in a man, aged 56 years, and argues in favor of the hypothesis that chorea is due to a lesion of the motor area of the cerebral cortex, but his arguments are not very convincing.

Augier²²⁰ reports the case of a girl, aged 5 years, who suffered from an attack of hemichorea absolutely limited to the right side during three weeks. She remained well one week, and then was attacked by a hemichorea absolutely limited to the left side. Mettler⁶⁰ publishes a lecture which contains nothing new. Gairdner²¹³ reports a case in a man, aged 54, which was of eighteen years' duration and had followed a mental shock.

Hereditary Chorea.—Herringham⁴⁷ publishes a very complete article on hereditary chorea. In 1842 Waters, of Franklin, N. Y., wrote to Dunglison describing a peculiar form of chorea infesting certain families in that neighborhood, which was remarkable in four points: It was markedly hereditary; it rarely appeared before adult life, or after 45; it was incurable, and in all cases induced dementia. The same disease was found by Charles Gorman, of Luzerne, Pa., to prevail in other portions of the country also. The next description is by Lyons, who writes, twenty years later, that he has been familiar with it all his life; that it occurs in certain families only; that it is hereditary, and that it is called "migrimis" by the people. He gives 3 histories, 1 in which five generations, 2 and 3 in which three generations, were affected. In 1872 Huntington described an hereditary chorea in a few families in a part of Long Island. It affected males more than females, came on gradually, always after middle life, was incurable, and was usually accompanied by insanity and a tendency to suicide. If one of the family escaped, his descendants were ever after free from it. Ewald, King, Peretti, Huber, West, Zacher, Hoffmann, Macleod, and Lannois have all reported cases of this disease.

From these authors a good picture of the disease can be constructed. It is a disorder of movement affecting the voluntary muscles only, and exactly resembling chorea in appearance. The disease is hereditary, and affects more individuals of the families which it infests than most other hereditary diseases. On the other hand, all agree that when once the chain is broken the disease does not recur. An exception to this is, however, to be found in Lyon's paper; but he does not seem to be speaking from personal knowledge. The character of the inheritance is therefore peculiar. The disease affects both sexes, and is inheritable either through the female, as in Ewald's, or through the male, as in Huber's case. It nearly always begins at or after 25 years of age, but occasionally

earlier. Lyon, an exception in this, as in many other points, speaks of its beginning at puberty. The disease does not develop out of ordinary chorea, but begins without known cause by twitching in the face (King, Huber), spreading thence to the arms and later to the legs, or is general (Hoffmann) from the first. The movement is violent and coarse in character, not, like Friedreich's paramyoclonus, a fibrillar twitching insufficient to move the limb. In the legs it produces a curious gait; there is a sudden stoppage, the patient looks as if he was going to fall forward, sways his body violently, at last is able to take a few rapid steps, and so recovers his balance (King, Hoffmann, Lannois). In most cases the movements cease in sleep, but Hoffmann noticed them even then. There is no wasting of muscles, no anæsthesia; the deep reflexes are natural or somewhat increased, and the electrical reactions are normal. There is no heart disease connected with the affection, nor is rheumatism an antecedent. The disease is very commonly followed after a short time by some mental degeneration. This is noticed by every author except Lyon and Ewald. Though usual, it is not invariable. The choreic insanity begins with loss of memory, childishness, and goes on gradually to dementia. In two cases (Huber, Zacher) there were fits of violent destructiveness.

There have been 3 post-mortems recorded. Macleod (if his cases be admitted) found in 1 case a subdural hæmorrhagic cyst, with leptomeningitis over one side of the brain only, in another multiple tumors in the dura mater. Huber transcribes the post-mortem record of the father of his own patient. Pachy- and leptomeningitis were the only lesions. Another post-mortem, which will be of great importance, is to be expected from Klebs, who has dissected 1 of the cases, which Huber reports in detail.

It is of the greatest interest to compare this disease with ordinary chorea. The movements are of similar character, and in both there is commonly mental affection. The one is closely connected with rheumatism and heart disease and recovers. The other has no such connection and is progressive. The conclusion which the comparison suggests is that the two are produced by affections of the same parts, but of a different nature. On the other hand, it has certain analogies with general paralysis. Tremor and weakness in the one are replaced by loss of control and involuntary movement in the other; loss of muscular power supervenes at the

end of some cases. The exalted delusions of the general paralytic are in some instances (Hoffmann) of this disease represented by cheerful misrepresentation of their real condition. The post-mortems show here, as in general paralysis, affections of the meninges.

Sinkler²⁴² publishes a valuable paper on hereditary chorea. Since Huntington's paper 9 other cases of this disease have been reported, and of all of these Sinkler gives abstracts, and reports 2 new cases of his own with a full family history in each case. Although in the main Huntington's conclusions still hold good in the light of a larger experience, yet in some slight respects they need modification; thus, if one member of an afflicted family escapes it his descendants do not necessarily escape, but may be attacked by the disease, which has been known to commence in a number of cases before the age of 30, in 1 case as early as 10 years. The large number of children frequently found in families afflicted with this disease is striking. The knee-jerk in hereditary chorea seems to be exaggerated, while in ordinary chorea it is more usually than not decreased.

King⁹ reports an interesting case of hereditary chorea (he having previously reported 2 other cases) in a man aged 60, who had suffered from it during fourteen years, and in whose family there had been a number of cases, and 2 of whose sons were beginning to exhibit its symptoms; and Diller,⁵ Kornilow,⁵⁰⁰ and Suckling⁶ report cases of this form.

Treatment.—Bastian⁶ treated a case of severe chorea by prolonged sleep. The patient, a girl aged 20 years, exhibited many hysterical symptoms, and the choreic movements were not of the usual irregular form, but rather of the nature of a tremor. By means of repeated doses of chloral and bromide of potassium she was kept asleep constantly, only being allowed to be awake a half hour at a time, when she was fed. At the end of two weeks of this almost continuous sleep she was allowed to be awake for a week, after which she was kept asleep again during three weeks more. A fortnight afterward she was discharged from the hospital greatly improved, a slight tremor remaining in the right hand only. Bastian has treated 8 or 9 cases in this way during the last twelve years with varying success.

Gairdner⁶ reports a number of severe cases of chorea treated

by chloral hydrate. In one of them, a girl aged 8, the treatment was begun with 5 grains (0.3 gramme) three times a day, steadily persevered in, and gradually increased until the dose reached 15 grains (1 gramme) thrice daily. At this time, by a mistake, a dose of 60 grains (4 grammes) was accidentally given to her about 9 A.M. on February 26th (seven weeks after admission). About an hour later symptoms of poisoning set in, which, without ever perhaps arriving at the point of extreme danger, may be said to have lasted in a severe form more or less up to 2 P.M., when a gradual recovery began to take place. Without going into the details, it may be said that more than twenty-four hours later the patient was still unduly drowsy, and was not awakened by the introduction of the thermometer into the rectum, all the spasms having absolutely disappeared. On April 22d (nearly two months after the overdose) "we were able to record that since the accidental overdose described above the girl has had no return of the chorea even in the slightest degree, and is to-day sent to the Convalescent Home." Gairdner summarizes as follows: "On the whole, my experience of chloral hydrate entitles me to affirm this much, and no more: 1. That it sometimes succeeds in chorea absolutely, where other remedies fail. 2. That it can be depended on, as a rule, in very severe cases, to initiate a treatment which may be afterward successfully carried out otherwise. 3. That in such cases it has an almost absolute power of suspending or controlling spasm during the persistence of its deep hypnotic action, and is therefore invaluable as a palliative (care being taken, of course, to avoid poisoning, either acute or chronic). 4. That this or other limitations will interfere with the curative action of the remedy in some very inveterate cases; the failure of chloral hydrate in these cases, however, being common to it, with all other remedies."

Schrötter⁸ contributes 2 severe cases of chorea treated by sedatives, such as bromide of potassium and chloral, and by pouring cold water on the head and back while in a warm bath. One patient made an unusually rapid recovery, the other died, and at the autopsy no definite lesion of the heart or nerve-centres was found.

Simon¹⁰⁸ states that he has obtained the best results in the treatment of chorea from antipyrin. He gradually increases the dose from 8 to 60 grains (0.5 to 4 grammes) a day. Legroux²⁵

regards antipyrin in doses of 15 grains (1 gramme) three times a day a most speedy and effectual remedy for chorea, and Moncorvo³⁵ reports a number of cases of chorea in which the treatment by antipyrin proved very efficacious. Goubert³⁴⁵ recommends bromide of gold, $\frac{1}{10}$ of a grain (0.006 gramme) daily at first, and increased by $\frac{1}{80}$ of a grain (0.001 gramme) daily till sleep is produced. Sottas¹⁵² reports a case of chorea cured in forty-five days by ether spray to the spine, bromide of potassium and chloral internally. Ollivier⁵⁷ discusses in an interesting manner the therapeutics of chorea.

TONIC AND CLONIC SPASM.

Hammond⁹ discusses the pathology of tonic and clonic spasm. All authorities are agreed, according to this writer, that tonic spasm is produced by an irritation situated in the white conducting nerve-fibres of the motor tract, but in regard to the situation of the lesion producing the clonic spasm there is great diversity of opinion. He has collected the reports of autopsies in cases of clonic spasm in which the lesions were not so extensive as to make the cause of the spasm a matter of doubt. Taking these together, it can readily be seen that in all of them, without exception, the lesions were found constantly in three areas, viz., the cortex, the optic thalamus, and the corpus striatum. In a careful examination of all cases it is found that, when the anterior two-thirds of the internal capsule are involved, spastic spasm is invariably present. After a study of these cases Hammond cannot agree with Demarge and Sharkey, that mobile spasm may be due to lesion of any part of the motor tract; nor with Stephan, that the lesion is in the optic thalamus; nor with Charcot, that it is in the thalamus, and, in addition, in the posterior third of the internal capsule, but he believed that it may be produced by any lesion of an irritative nature situated in any part of the brain where nerve-cells are located; these cells being located in the cortex, optic thalamus, corpus striatum, and pons. The difference in the form of the spasm, he thought, was one of degree, and not one depending on the location of the lesion, and it was, therefore, impossible from the symptoms to differentiate between a lesion of the cortex, optic thalamus, and corpus striatum.

Hughes⁹⁶ describes a case of persistent spasm of the levator anguli scapulæ muscle in a child 2 years old. The deformity in

this case was the same as is described by Ross, the upper and inner angle of the scapula being strongly elevated, the head slightly inclined to the same side, the shoulder drawn forward, the supraclavicular fossa increased in depth, the contracted muscle projecting distinctly beneath the anterior border of the trapezius.

Athetosis.—Eulenburg^{113 Feb. 24} communicates 4 cases of hemiathetosis. The first of these was idiopathic, and in it the movements were limited to the right hand and were associated with a constant elevation of temperature of from 1° to 2° C. in that hand. The other 3 cases were symptomatic, occurring in epilepsy, in hemiplegia after scarlet fever, and in polioencephalitis acuta infantum, respectively. In all 4 cases the movements ceased during profound sleep, but persisted to a moderate degree during light sleep, from which fact Eulenburg is strengthened in his belief that the point of origin of the movements of athetosis lies in motor regions of the cervical cortex, notwithstanding that many autopsies have shown a lesion of the anterior portion of the internal capsule in such cases. The results of treatment were very unsatisfactory in all the cases, although the stable application of the galvanic current produced some transitory improvement.

Krafft-Ebing^{8 Apr. 18} reports one of those rare cases of idiopathic bilateral athetosis occurring in a man, aged 42 years, after a thorough wetting. In this case there was a paresis and fibrillary contraction of the muscles which were the seat of the athetoid movements, together with a subjective sensation of cold and objectively anæsthesia in the same parts, viz., both hands and forearm, and an exaggeration of the deep reflexes in both the upper and the lower extremities. The electrical reaction of all the muscles was normal. Although in this case the symptoms are bilateral, yet the motor paresis is more decided on the right side, while the athetoid movements and anæsthesia are more decided on the left side. A treatment lasting six weeks, and consisting of 1½ drachms (6 grammes) of bromide of potassium daily, and the stable application of the galvanic current of 2 milliampères, the positive pole on the brachial plexus, the negative on the neck, brought about a temporary cure, which would probably have been permanent had the treatment been continued longer.

Sabrazès^{188 Oct. 4} had a case of athetosis, following a left-sided hemiplegia, in which the autopsy revealed four or five points of softening

of the size of the head of a pin in the right nucleus lenticularis, and an old hæmorrhage of the size of a hazel-nut lying between the body of the nucleus caudatus and the optic thalamus, and involving the knee of the internal capsule of the right side. Von Bonsdorff⁴⁹⁸ reports a case of athetosis affecting principally the left hand of a woman aged 43 years. The disease commenced in childhood, after a fall, which caused no other disturbance.

Paramyoclonus Multiplex.—Manquat,¹⁴ in an interesting discussion of paramyoclonus, comes to the conclusion that this disease is due to a peripheral neuro-muscular disturbance, which may be accompanied by an analogous change in the motor cells of the spinal cord, and sometimes also by reflex acts which have their point of origin in the muscles. These disturbances are of a nutritive nature and lead to chemical alterations in the tissues. Vanlair,⁹² ²⁹⁸ gives a very interesting review of our knowledge of paramyoclonus, and describes the case of a dog, in which this condition developed in consequence of the resection of a nerve in and the amputation of a leg.

Tic Convulsif.—Charcot,³⁴⁵ in a clinic lecture, reports a case of tic convulsif, and cites many others from his experience. He regards the exclamations and words uttered in the disease coprolalia as closely allied to the tics. Mehlhausen,⁴ adds an interesting case of this disease.

Reflex Neurosis.—Erb⁸⁴ describes the case of a man, aged 44 years, who during nine years had suffered from a curious reflex spasm affecting principally the respiratory muscles. Upon any sudden sensory impression, whether tactile, optical, or auditory (sudden touch or pressure on the skin, especially of abdomen, sudden approach of a hand to his eye, clapping hands, ringing a bell, snapping a whip, etc.), the patient jerks his legs, jumps up in the air, and makes a number of quick, noisy expirations through the nose, with closed mouth, and at every inspiration opens his mouth with a smack, and during this time his respiratory movements appear to be very labored. In other respects he presents no striking abnormality. The disease seems to be closely allied to hysteria.

Professional Neurosis.—Remak⁶⁹ reports a very interesting case of milkmaids' cramp. The patient persisted in doing an excessive amount of milking daily, although she accomplished the task only with great difficulty. Her symptoms consisted in frequent

attacks of spasmodic flexion of the thumb and of the first three fingers of her right hand, accompanied by severe pains shooting up her arm. In addition, there was anæsthesia in the domain of the cutaneous distribution of the median nerve, and the muscles supplied by this nerve were atrophied and presented the electrical reaction of degeneration. These paralytic symptoms Remak ascribes to a degenerative neuritis of the median nerve, while the attack of muscular spasm he regards as being of reflex origin.

Woodbury⁷⁰⁰_{Nov 11} gives the interesting case of a carpet-weaver, aged 35 years. His occupation compelled him to use his right side exclusively, the arm being employed in throwing a shuttle and the leg in pressing a treadle. After having been overworked and worried a great deal the patient began to lose control over the muscles of the right arm and leg, rhythmic contraction being developed whenever he attempted to work. Later he found the rhythmic movements coming on at other times when he was not working. These spasmodic attacks were somewhat influenced by the will, the patient being able to control them by a mental effort. There was some loss of power in the affected muscles, but no evidence of atrophy or impaired sensation. The left side was entirely unaffected. Woodbury remarks that recovery is impossible as long as the patient continues to work. The patient was advised to take a sea-voyage, as a favorable opportunity for his doing so had occurred.

Féré⁷³_{Jan 11} reports a case of a flute-player who noticed a difficulty in bringing down the two last fingers of each hand on the stops. This difficulty increased and became associated with a cramp of the antagonistic muscles, so that he was unable to hold the flute. By means of local massage, and especially of general tonic treatment, he made an almost complete recovery. Féré agrees with Gallard, that cases of professional cramp are due to a general rather than a local weakness or exhaustion, and in this opinion he is supported by Brown-Séguard.

Zenner⁵⁸_{July 12} details a case of silver-gilders' cramp, in which, after long-continued work at this occupation, the elbow was drawn firmly against the body, and flexion and extension, both at the wrist and elbow, were difficult. The patient also suffered from pain and tremor in the arm.

Lehr⁶⁹_{Aug 12} recommends the use of a glass pen (such as is often

used in this country for marking underclothes with indelible ink) in all varieties of writers' cramp. Laquer,⁷⁵ reports the case of a man who was treated by massage for the cure of writers' cramp. Apparently in consequence of the massage all the muscles supplied by the right radial nerve became the seat of severe clonic spasms, which, after continuing eight months, were suddenly cured by fear of the operation of nerve stretching.

Tremor.—Preston⁶⁹ gives a review of our knowledge of tremor, which he explains in general by the fact that the normal number of contractions occurring when the muscles contract, which is 32 per second, has been shown by Brouardel, Marey, Gowers, and others to be reduced to 6 or 7 per second in paralysis agitans, multiple sclerosis, mercurial tremor, etc. Tremors may be divided into the acute, embracing those produced by (a) cold; (b) fright, anger, or great emotion; (c) adynamic fevers. It is not necessary to describe any of these acute forms, but they should be borne in mind in making a diagnosis. Nervous females, especially when being examined by a physician, show often in a marked degree this acute tremor. The chronic form includes (a) cerebral or spinal lesions, such as primary lateral sclerosis, disseminated sclerosis, ataxic lateral sclerosis, post-hemiplegic affections, bulbar paralysis, general paralysis, myelitis, by compression especially, and certain forms of chronic meningitis; (b) lesions of nerves and muscles, as neuritis and muscular atrophies; (c) metallic poisons, as mercury, lead, arsenic, along with which may be classed the tremor of syphilis, alcohol, tea and coffee, and tobacco; (d) certain affections the pathology of which is not understood, as paralysis agitans, hysteria, exophthalmic goitre, athetosis, senile and hereditary tremors, and a certain form described as simple tremor and chorea. Of course, a great number of these forms are not discussed, and are mentioned only to make the list complete.

Peterson²⁴² publishes an article on tremor due to various causes, illustrated by numerous tracings taken by means of the Edwards sphygmograph. In accordance with the experiments of Horsley, Schäfer, and Beaunis, he regards the normal innervation rhythm to be 10 per second, and finds that the number of oscillations in paralysis agitans is 3.7 to 5.6 per second; those of multiple sclerosis 4.6 to 6.3 per second in a well-marked case, and 7.9 to 8.1 per second in a commencing case; those of Base-

dow's 8.7 to 12 per second; those of hysterical tremor 7.6 to 7.8 per second; those of ordinary alcoholism 8.5 to 11.2 per second; and those of delirium tremens 5.6 to 6.8 per second.

Suckling⁶ exhibited a man before the Midland Medical Society who had been a barometer-maker for twenty-two years, and who presented a well-marked mercurial tremor. Patient first noticed trembling in hands twelve years ago, the tremor ceasing when hands were at rest and being exaggerated by exertion. It gradually grew worse and extended to legs, so that walking became awkward and difficult. About four years ago his speech became slurred and the tremor affected his head. The tremor is fine and rhythmical. It was scarcely perceptible when he was at rest, but became violent on effort, he being unable to lift a glass of water to his mouth without scattering it about. A few months later Suckling⁶ showed to the same society a laborer, aged 60 years, who for two years had suffered from violent attacks of tremor of the right upper extremity. The patient was a very excessive smoker. The tremor affected the right upper extremity only. It was of great amplitude and violence, consisting of very rapid flexions and extensions of the forearm, which could not be controlled voluntarily nor by force. There is no aura preceding the attack, but coincidently with the onset of the tremor the patient perceives pain in the upper part of the right thigh. There is no loss of power in right arm or leg, no alteration in the reflexes, and no optic neuritis. Emotional disturbance and unexpected loud noise at once bring on a spasm. The tremor ceases abruptly and spontaneously. Suckling considers that it will become continuous, and that the case is one of paralysis agitans.

Arkle⁶ reports the case of a man, aged 62 years, a looking-glass silverer, who was the subject of mercurial tremors. This was the third attack, and involved the hands, head, and tongue. Sensation was perfect; there was no nystagmus, and he had not worked in lead. In reply to questions, Arkle stated that the tremors ceased during sleep, and that the treatment consisted in small doses of iodide of potassium and sulphur-baths.

Thomsen's Disease.—Martius²⁰ describes in detail a very interesting case which corresponds perfectly to myotonia congenita (Thomsen's disease), except that the condition was not constant but intermittent. Usually, the muscular action was entirely

normal, and it became abnormal only under the influence of cold; and then the muscles continued in a state of contraction during a very considerable time after the volition causing the contraction had ceased, the transition from a warmer to a colder temperature being the only exciting cause for an attack, which usually lasted a couple of hours. The mechanical and electrical reaction of nerves and muscles peculiar to myotonia congenita were present in this case, but only during the attack and not at other times. The microscopic examination of an extirpated piece of the muscle showed a great increase in the diameter of the muscular fibres, multiplication of the nuclei of the sarcolemma, indistinct transverse striation, a twisting and constriction of the fibres—changes such as Erb has described as occurring in myotonia congenita. In the patient's family were a number of cases of a similar condition.

Nearonow⁷⁵_{Apr. 18} reports a case of typical Thomsen's disease occurring in a man aged 25 years. A microscopical examination of pieces of muscle extirpated during life exhibited an almost perfect resemblance to the description given by Erb. Wising³⁷⁰_{Jan. 28} describes the first case of Thomsen's disease ever reported in Sweden. The case was that of a student, aged 19 years, in whom there was no hereditary predisposition, but who presented all the characteristic symptoms and reactions of the disease in a very typical manner. Fleetwood²⁸⁵_{Sept. 18} reports an interesting case of Thomsen's disease in a man, aged 26 years, with hereditary predisposition, in whom it made its appearance before he was 12 years of age.

NEURASTHENIA.

But very little of interest has been published in this department during the past year. Pelizaeus⁴¹_{Apr. 1} publishes a paper on the differential diagnosis of neurasthenia, in which he attaches especial weight to a transitory inequality in the size of the pupils which occurs in functional nervous diseases, and which, in a general way, varies with the severity of the disease. Daly¹_{Aug. 17} endeavors to prove that certain cases of neurasthenia are directly due to disease of the nose and pharynx, and reports 2 cases which are not at all of a convincing nature in support of this view. McBride⁹⁸_{Jan.} has an article on some circulatory and sensory disorders of neurasthenia. Myrtle²⁶_{Feb. 1} publishes an interesting paper on true and false neurasthenia, and Crego¹⁷⁰_{Jan.} writes an interesting article on neurasthenia.

MENTAL DISEASES.

By EDWARD N. BRUSH, M.D.,

PHILADELPHIA.

THE literature of psychiatry for the year 1889 has not contained anything of striking novelty, and yet it has exhibited a commendable zeal on the part of practitioners in this field, and a determination to push forward along the whole line. If one were required to summarize in a few lines the more-important contributions to the periodical literature of this department of medicine, and those which have contained the most valuable suggestions, one would, I think, refer to the general interest which appears in various quarters in reference to administrative questions in hospitals for the insane.

In some sense interest in these questions was doubtless provoked by the article of J. Batty Tuke.¹⁰²¹ It would be unjust, however, to asylum practitioners to say that their attention was for the first time aroused and their interest awakened by this article.

The questions which it propounds have been discussed again and again in England, on the Continent, and in this country.

In one State, at least—New York—a policy was long ago adopted, which in theory, and to a large extent in practice, looked to the more active and careful supervision and treatment of acute insanity as distinguished from chronic and incurable forms.

What New York has done as a State, Batty Tuke believes each institution should do of itself: devote more care and thought to the few acute and curable cases within its walls, that are, he thinks, in danger of being overlooked in the mass of chronicity around them, as well as incurring the risk of positive harm from such enforced associations.

Brudenell Carter,⁶ in some remarks before the London County Council, takes ground somewhat similar to that held by Tuke, and advises the establishment of hospitals somewhat upon the plan of general hospitals for acute cases of mental disturbance. His suggestions will be presented further on.

Many institutions, both in this country and abroad, could be named in which for years the prompt and energetic treatment of acute cases has been kept constantly in view, but defects in structure, difficulties of administration, or other obstacles have, in too many instances, hindered, if not absolutely thwarted, such a desirable end. Hospitals, not asylums, or, as Tuke puts it more boldly, "patients, not prisoners," has been the motto of many an anxious and too often overburdened physician in these institutions, and in too many instances the ideal which he hoped for, the good he would do, has been pushed aside or covered by expediency or necessity which he could not control. The addresses of Chapin, Newington, Hack Tuke, and Manning, and the opening address of Krafft-Ebing, to which reference will be made, deal from various stand-points with this and allied questions.

Next in importance in the literature of the year, and in a sense secondary to the questions referred to above, may be mentioned several articles more or less carefully worked out upon various points in the therapeutics of insanity. Among these it will be found that the interest in hypnotic drugs has not abated.

A collection of the literature of the year upon insanity would be incomplete, indeed, which did not contain some new or modification of an old classification of mental symptoms, and the classifications presented for the *annus medicus* which has just closed are no worse and no better than many which have been assigned to the limbo of the forgotten past.

Possibly as a reaction due to disappointment over the meagre results which have followed attempts to explain disordered mental states upon a purely physical basis, and to show a pathological antecedent for every disordered mental consequent, and possibly independent of this, there has arisen within a few years, in the minds of many alienists, an increased interest in pure psychology and psycho-physiology. At the meeting of medical officers of American institutions for the insane, in June, 1889, an interesting discussion upon work and study in these fields was conducted by Stanley Hall, of Clark University, and Cowles, of the McLean Asylum, ²⁷⁸ two men, who, in their separate departments of study, have done most of the work in this line in America. It is to be regretted that the paper of Cowles and the remarks of Hall have not yet been published in full. Other valuable work has been put

upon record.²⁶³ In France a laboratory of psycho-physics has been established under the direction of Beaunis, of the chair of Physiology at Nancy.²⁴¹ It may be that some of the students of psycho-physics will offer us at some time an explanation of a phenomenon which has often been observed,—the tendency of certain ideas to find expression through different minds often widely separated at almost the same period of time. This is curiously illustrated by the appearance almost contemporaneously of articles upon post-operative insanity, notably the contributions of Thomas in this country, Dent in England, and Mairét in France.

General paresis continues to supply a text for numerous articles, and the relations of syphilis to this and other forms of brain disease afford a by no means uninteresting topic for discussion.

Two new methods of treatment for paresis have been introduced—trephining and suspension. In the former the surgeon is introduced to the field of psychiatry in a new direction. The time has not yet arrived, however, when we can hope to rival our neurological brethren in their brilliant regional diagnoses and point out where the surgeon may cut to relieve a psychical perturbation.

TREATMENT OF THE INSANE.

Under what may perhaps be properly termed questions of administration, the article of Batty Tuke¹⁰²¹ deserves notice. After reviewing the history of lunacy administration and asylum management, and calling attention to the oft-repeated statement that asylum superintendents have more to do with administration and executive details than medical treatment, Tuke points out what he considers some of the weak points in psychiatric medicine and suggests some remedies. He intimates that treatment is too much a matter of routine and empiricism, and that we have no “system of so-called psychiatric medicine so firmly based on pathological principles as to meet with general acceptance.”

Much that Tuke says is true, and yet he is not by any means the first to recognize the defects of the asylum administration of Europe and this country. By no means the most lenient criticism which the system has received has come from asylum superintendents and medical officers, and the very remedies which he suggests have been proposed, as will be shown further on, by asylum

men. It may be true that we have no distinct pathological foundation for treatment, and the very nature of the varied symptoms which we call insanity indicates the hopelessness almost of expecting any; yet it may be well questioned how much more pathology has done in marking out successful lines of treatment, in the majority of diseases, than has been accomplished by "good hygiene and personal experience." No one will, however he may differ on other points, dispute with the author upon the necessity and advisability of some arrangement, in connection with all of our hospitals and asylums for the insane, for the separation of the acute from the chronic cases, and the application toward their recovery of the best means of modern medical science.

In the direction of the improvement in the treatment of acute insanity which Tuke and others have urged, the report of R. Brudenell Carter, ⁶_{Nov. 9.} chairman of a committee appointed to inquire as to the advantages to be expected from the establishment, as a complement to the existing asylum system, of a hospital with a visiting staff for the study and curative treatment of insanity, will be read with interest.

The committee makes the following recommendations: "1. That an adequately equipped hospital, containing 100 beds, for the study and curative treatment of insanity in pauper lunatics of both sexes, be established in the metropolis, and that it be under the direction and control of the council. 2. That the ordinary medical staff of the hospital consist of a chief resident medical officer who has had asylum experience; of an assistant resident medical officer; of four visiting physicians, each of whom shall hold office as physician or assistant physician in a general hospital; and of a pathologist; the members of this staff to perform such duties and to receive such stipends or *honoraria* as the council may from time to time direct. 3. That, in addition to the ordinary medical staff, the following honorary medical officers be appointed, namely: A surgeon, an ophthalmic surgeon, an aural surgeon, a laryngologist, and a gynæcologist. Each of these honorary officers should hold, or should have held, similar office in a general hospital, and they should all be available as consultants whenever required by the physicians, or for the performance of operations which fall within their respective departments when such operations are decided upon." If, after due consideration, these

recommendations are adopted, the outcome will be most eagerly watched.

Chapin, in his address as President of the American Association of Asylum Superintendents,²⁷⁸ presents at the outset a brief review of the work of the association and the objects toward the accomplishment of which its work had been directed. He refers incidentally to the influence which the association has exercised in the past in the creation and organization of hospitals for the insane in various portions of the country, especially in the new States, and touches upon the discussion concerning the separate care of acute and chronic cases which, a quarter of a century ago, was an active element of interest in the meetings of the association. In the solution of this problem he did more, it is proper to say in this connection, than any other member of the organization by the practical demonstrations of his principles made in his work at the Willard Asylum. He then shows what an advance has been made in the care of the insane by improved attendance obtained through the introduction of training-schools for attendants, the abolition of much of the mechanical restraint that was formerly deemed necessary, the decoration and general improvement of asylum interiors by painting, pictures, the removal of unsightly window-screens, the introduction of ordinary furniture, and a general endeavor to produce a cheerful and home-like effect.

One of the most important topics in this address has reference to distinct wards, or rather a distinct hospital structure, in connection with the institutions already in existence, and Chapin calls attention to the fact that in his annual reports of 1887 and 1888 he advocated the construction of a hospital building, limited in extent to the requirements for acute cases and those needing, for any reason, special observation, distinct from the other hospital buildings. The whole address deserves careful attention, and is replete with suggestions in the line of improvement upon present methods of asylum care, and the tenor of it all may be expressed in this quotation: "The advance would be in the direct line of recent tendencies,—the individualization of classes,—which principle should be further extended so as to include persons."

H. Hayes Newington,¹⁸⁶ in his presidential address before the British Medico-Psychological Association, considers the statements of Batty Tuke and the proposition of Brudenell Carter already

referred to, and defends his fellow asylum officers from the charge of a non-medical spirit, and the asylum system generally from the imputation of being simply a comfortable and convenient method of safe custody, with little regard to the study or cure of insanity in its various forms.

Newington shows, by quoting from the testimony of Lord Shaftesbury before the Dilwyn Committee (1877), that as long ago as 1845 early and separate treatment was provided for in the Act of that year. "It was the intention," says Lord Shaftesbury, for so many years the head of the English Lunacy Commission, "to divide the asylums into two classes—the principal asylum, which was to be for the acute cases, with the chronic asylum alongside of it. All the recent cases were to be sent to the acute asylum, which was to have a full medical staff, and the chronic and incurable cases were to be drafted into the chronic asylum." Newington shows that the increase of insanity is in an accumulation of cases, and is not due to a disproportionate and increasing number of new cases. He might, indeed, have gone farther than he does, and claimed, as he claims for medicine in general, that psychiatric medicine is responsible for this accumulation of cases by reason of the very fact, which its critics deny, that its methods have improved, and that it has succeeded in prolonging the average duration of life of the lunatic. He puts to Tuke, and those who follow his leadership in charging psychiatric medicine with having no reliable pathology as a basis for treatment, some rather difficult questions to answer. He, for instance, asks if general medicine, which for ages has had pressed upon its attention the problems of hysteria and of delirium, whether of exhaustion, fever, or alcohol, can give the exact pathology of these conditions. Does, indeed, any department of medicine depend upon a special pathology, but does it not rather follow, as do all other departments, the *dicta* of general pathology and base its treatment upon principles which, modified by the special features of the case in hand, are applicable to all?

The address of Krafft-Ebing ^{on 1881, 1882} reviews the progress of psychiatry, and defends psychological medicine from the charges which have been made against it of slow progress and an unscientific basis for its therapeutical processes. He admits that as a science it is, and must content itself with being for some time, of the descriptive and not of the explanatory order.

The cause of its tardy development lies, first of all, in the enormous difficulties which it has had to surmount. He shows that, from the very incomplete ideas of the anatomy of the nervous system, a conclusion from structure to function is exceedingly difficult, and especially so as related to psychical functions. Even pathological anatomy must admit the impossibility of naming or pointing out lesions explanatory of the most-marked disturbance of function.

It is, moreover, within a hundred years that real asylums have been established in Europe and opportunities offered for even the most crude study of disordered mental processes.

The reforms of Chiarugi, the Italian, followed by Pinel at the Bicêtre, first enlisted humanity in the work, and since then science and philanthropy have worked hand in hand in the amelioration of the condition of the unfortunate insane and the creation of a rational therapeusis and sound pathology. The next step in the advance was the creation of chairs of psychological medicine in a few medical schools and the establishment of clinics of mental diseases. It was not until within thirty years that psychiatry became a recognized branch of medical teaching, though clinics were in a few instances established long before. Even at the present day the subject is given but little attention in most medical schools, and in a few, if any, does it form a necessary subject for the degree. To Benjamin Rush and the Pennsylvania Hospital belong the honor of establishing the first clinical instruction in insanity. Rush was followed, in 1817, by Esquirol, at la Salpêtrière, and by Sutherland, in 1846, at St. Luke's Hospital, London.

Another fetter upon the limbs of the growing science has been, according to Krafft-Ebing, a too great reverence for philosophy as illustrated by the writings of Spencer, Bain, Maudsley, Fechner, w Mundt, and others. Modern psychology, he says, can only attempt to explain the psychical phenomena of insanity. To attain the height of a clinical science psychiatry went farther, and, starting with the *dictum* that insanity meant brain disease, it has now gone a step farther and has turned its attention to the non-psychical phenomena of brain function. He might have added that it was also displaying a tendency to invade the field of the psychologist, and was displaying in some quarters a marked interest in psycho-physics. He concluded with a hopeful view of

the future of psychiatry, and shows some directions in which it may, with credit, expend its energies.

The address of Manning¹⁸⁶ deals almost wholly with the history of lunacy administration in Australia. He shows that the colony is well abreast of the mother-country in the cure and treatment of the insane, and that still further progress may be expected. The recovery-rate in Australian asylums is a trifle higher than in Great Britain, being 42.09 per cent. as against 40.04 per cent., and the death-rate is lower than in England or Scotland. In New South Wales and Queensland reception-houses are provided for acute cases, and in Victoria there are lunacy-wards in the general hospitals.

D. Hack Tuke¹⁸⁶ summarizes his addresses before the Psychological Section of the British Medical Association as follows: The resources for boarding out patients with strangers are, as regards England, of a very restricted character. The practice of paying the friends of pauper patients something toward their maintenance should be encouraged. After all that is done, however, the mass of pauper lunacy in England remains a fearful tax on asylum accommodation.

The work-houses (almshouses) under proper conditions, including separate lunatic wards and effectual supervision, should be used to the greatest possible extent for that hopeless and chronic class of cases which experience has shown may be cared for with sufficient regard to their comfort and interest.

In America, almshouse care of lunatics has proven so disastrous, and has been the subject of such scandal, that few can be found to commend it. Tuke has seen and condemned it, but doubtless feels that the English system, with "effectual supervision," may be safe. He recommends a re-adjustment of the capitation grant to avoid tempting guardians (of the poor) to send chronic cases to asylums. After provision in work-houses and private dwellings have been exhausted, the great majority, 66 per cent. of the insane poor, must be provided for in county and borough asylums.

He recommends the preparation of distinct blocks in connection with the existing asylums for the presumably curable cases, or a separate hospital for that class at some distance from the asylum.

Hypnotics.—The subject of insomnia and its treatment continues to receive a considerable share of attention. Of the hypnotic agents which have received most notice, sulphonal takes the lead.

Lemoine¹⁸¹ contributes a thoughtful article upon the general treatment of insomnia, in which he follows the *dictum* of Chomel, "that the patient, not the disease, is to be treated." He argues that it is at once unscientific and usually disappointing in results to treat insomnia in a routine way. The unfortunate and too frequently disastrous tendency to prescribe bromides received at his hands a decided protest. In many cases—for example, neurasthenic and hysteric patients—the plain indication is a tonic and supporting rather than a sedative course. Lemoine does not appear to be familiar with the use of hyoscine, but finds beneficial effects from hyoscyamine in doses of 1 milligramme ($\frac{1}{1000}$ grain). In cases of insomnia from alcoholism and general paralysis he employs the bromides.

Jastrowitz¹⁸² contributes an elaborate article upon the general treatment of insomnia. He considers, for convenience of study, insomnia an essential disease, for which, therefore, there arises an *indicatio morbi*, *indicatio symptomatica*, and an *indicatio causalis*. In discussing these various conditions he first considers the nature of sleep. Under the head of *indicatio causalis* he points out that distinction must be made between those causes which act primarily on the brain and those which act indirectly. In the first class are diseases of the brain caused by excessive mental work and emotional excitement. Where there is direct disease of the brain the primary indication naturally follows, but in other forms of sleeplessness nothing save the symptomatic course is indicated. Since it does not always follow that relief from overwork or excitement results in relief from insomnia, where the insomnia is the result of the combination of mental causes with overwork the problem becomes more intricate. For this, the rest-cure, electricity, baths, massage, etc., are indicated. In certain other cases the relief of bodily pain is a primary indication. Where insomnia results from general diseases, such as fever, diseases of the kidneys or heart, and certain other forms of chronic disease, the plain indications are to palliate as far as possible the causative physical condition. Among the drugs that have been used for the treatment of insomnia, alcohol in various forms has worked to the

satisfaction of this writer. He has pointed out the very obvious danger of employing alcohol in those forms of insomnia in which there is a disposition to alcoholism. In the comparison of narcotics and hypnotics they are ranged in the following scale: morphia, chloral, amylene hydrate, paraldehyde, and sulphonal. If they were arranged, however, in order of hypnotic power, and at the same time their innocuousness, they stand in the following order: chloral, sulphonal, amylene hydrate, paraldehyde, and morphia.

Jastrowitz seems to favor, in certain cases, a combination of chloral and morphia. With all due deference to his authority, and that of other writers who have suggested the same combination, I cannot forbear calling attention to the danger of employing such a combination. After an extended experience in the use of chloral, the only cases in which fatal or even alarming results have followed have been cases in which the combination of these two drugs has been employed, and I have for years made it a rule not to permit their use, either in combination or the administration of the one to a patient to whom the other has been given within at least four hours.

Wetherill²⁷⁸ has contributed a readable article with tables and results upon modern hypnotics. He has grouped hyoscyamine, hyoscine, paraldehyde, urethane, and sulphonal. From his tables, which give the results of extended experiments, sulphonal appears to be the most certain in its results and urethane the least certain. Hyoscine comes next to sulphonal. Obersteiner, of Vienna, corresponding editor, has found very few hypnotics which give more general satisfaction and may be more easily and continually used than sulphonal. He finds that less than 1 gramme ($15\frac{1}{2}$ grains) is generally effective, and says that more than double this dose is unnecessary. The sleep is quiet and refreshing. In cases where pain is a factor morphia may be safely combined with the drug.

Marandon de Montyel¹⁵² has published the results of some clinical researches on sulphonal. Contrary to the author who has just been quoted, he finds that 3 to 4 grammes (46 to 62 grains) are necessary to get the best hypnotic effect. His observations were conducted upon 29 patients, and observed symptoms were carefully noted. Contrary to the observation of several writers, he finds that sleep is produced quite rapidly, and he observes the same persistence of the hypnotic effect after the sus-

pension of the drug which has been noted by others. He also notes certain toxic phenomena in the digestive and nervous system: among these were nausea, vomiting, anorexia, and diarrhoea; the effects upon the nervous system were of a peculiar character, and were principally observed in their mental manifestations. He divides the nervous disturbances from sulphonal into four groups: (1) those which compare to the well-known feelings in the morning, after a heavy drinking bout the night before; (2) that of drunkenness, with all its peculiar individual traits; (3) where ideation and memory are failing; (4) those of stupor, vertigo, difficulty in walking and speech, and even paresis of the limbs.

Otto Dornblüth¹¹⁶ contributes the result of his observations upon certain studies in the treatment of insanity, particularly as to the use of hyoscine and codeine. He employed first the hyoscine of Merck, but afterward of a chemical house in Berlin, which, though not one-half as expensive, was found equally efficacious. He used the drug hypodermatically and *per os*, using it in doses of from 0.001 to 0.002 gramme ($\frac{1}{1000}$ to $\frac{2}{1000}$ grain). No ill effects were noted, except some lassitude and occasional dryness in the throat. In periodical mania, and as a sedative for epileptics and general paralytics, he obtained excellent results. In the use of codeine he found that it was specially indicated where anxiety, distressing præcordial sensations, and insomnia are the dominating elements.

Those more especially interested in the literature of hyoscine are referred to the article of Séglas,⁷⁸ which will be found of value. In it he reviews quite extensively the literature of the drug. He is inclined to think that melancholia, in general, is more apt to be favorably affected by its employment than mania.

Garnier⁸³¹ reports at length upon the action of sulphonal in 17 cases, and concludes thus: 1. Sulphonal is a hypnotic of most remarkable intrinsic value in cases of insanity. In nearly every case of insomnia sleep was produced by doses varying from 2 to 5 grammes (31 to 77 grains). 2. It proved efficacious in cases in which paraldehyde, urethane, chloral, and hypnone had invariably failed to act. 3. The advantages of sulphonal in the insomnia of the insane are: The nature and amount of sleep procured by the doses mentioned; the facility in administering the drug by reason of its freedom from taste and odor; and also the

fact that it has no appreciable effect upon the respiration, circulation, and digestion. 4. It should be stated, in regard to its action upon digestion, that, as in 5.5 per cent. of the cases it excited vomiting and in 17.7 per cent. slight diarrhœa, its use is contra-indicated when these phenomena appear. 5. The use of sulphonal is sometimes attended with vertigo and difficulty in keeping the equilibrium, the patient appearing, in this respect, as if intoxicated. It may possibly be contra-indicated in the congestive forms of insanity. 6. The fact that it had a diuretic effect in 17.7 per cent. of the cases should be borne in mind when administering it. 7. Its calmative action by day is wanting even after a large dose, and if produced it is usually only a somnolence induced the day following the administration of the drug,—a condition it is well to avoid by reducing the dose. 8. After divided doses, in the single instance in which it was so administered, no sedative effect resulted by day and scarcely any at night. 9. About one-half of the cases to which sulphonal was administered only on alternate days were comparatively restful during the intervening nights. 10. In sane subjects sulphonal appears unquestionably to provoke and prolong sleep, as well as to render it more profound. The phenomena attending its use are few and of little consequence. It is indicated in all cases of nervous insomnia.

The foregoing references will fairly illustrate the opinions of the profession concerning sulphonal. A reference might be made to the numerous other articles relating experience with this drug, notably by Lojacono, ⁸⁸⁴ Mairat, ¹⁴ Mabon, ²⁷⁸ Worcester, ⁶¹ and Kisch. ⁴ The latter author reports a curious instance of aphasia appearing in a hemiplegic patient, following the administration of 15 grains (1 gramme) of the drug. Sleep was produced which lasted the entire night, but upon the following morning the patient was completely aphasic, and this condition lasted for eight or ten hours, the patient meanwhile feeling very debilitated.

Among the disagreeable effects which have been observed by the authorities quoted are disturbances of digestion, prolonged lassitude in some instances after the ingestion of a single small dose, and diarrhœa. In the ANNUAL for 1889 I mentioned two instances which had come under my observation in which diarrhœa seemed to follow the use of sulphonal, which was then, however, too new a drug to permit the observation of a series of cases: it

would seem well that a careful study should be made of the effect of this and some of the other new hypnotics upon the digestive system.

As a conclusion of an interesting and suggestive article upon hypnotics, sedatives, and motor depressants in the treatment of mental diseases, T. S. Clouston, of Edinburgh,⁵ presents the following: 1. Make up your mind clearly from the symptoms present whether your patient needs a pure hypnotic, a general nervous sedative, or a simple motor depressant before you use any of these drugs. 2. Use all such drugs experimentally in each case at first, and watch their effects not only on the higher nervous functions, but on the organs and their functions and on the general organism. 3. Even when there is sleep and quiet produced for the time, with no apparently bad results, look to the general feeling of *bien-être*, the recuperative energy, the expression of face and eyes after their use, and see if there is any undue reaction, as if some energy that must have an "outlet" were merely being "suppressed" for the time being. 4. Stop using such drugs as soon as possible, trying, experimentally, how the patient gets on without them. 5. Keep asking in every case: "Are we sacrificing in any degree the highest functions of mental inhibition by their use?" 6. Never omit general measures for the restoration of the health, nutrition, and higher nervous functions while you use such remedies. 7. Paraldehyde is the purest and least-harmful hypnotic yet introduced when the insomnia is marked and intractable. Urethane and sulphonal cannot compare with it. Opium and chloral have special dangers and disadvantages. 8. Use the bromides as accentuators and prolongers of the effects of other drugs, and in order to be able to employ smaller doses than otherwise. 9. A combination of cannabis indica and the bromides is the best and least harmful of general sedatives. 10. Hyoscine is the best pure motor depressant, but it needs care. 11. We never should narcotize an insane patient or one threatened with mental disease. 12. It is as dangerous to use more anodynes by the mouth or subcutaneously to relieve mental pain as to subdue bodily pain by these means only, perhaps more so. 13. It is generally far better therapeutically to enable your patient to bear his mental pain and the effects of his insomnia by improving his general nervous tone and the nutrition of his body than merely to produce quiet and sleep by drugs.

14. It is commonly a safer thing for the patients, and tends more toward natural recovery from his disease, to provide a physiological outlet for morbid motor energy than merely to depress it directly by drugs. 15. It is almost always preferable to treat cortical exhaustion, irritability, and undue reflex excitability by rest and by improving the fattening and nutrition of the body than by continuous sedatives, the great exceptions being the treatment of epilepsy and convulsive affections by the bromides.

Opium Treatment in Mental Diseases.—The use of opium in the treatment of mental diseases has been for a long time the subject of controversy, and many celebrated authorities on psychiatry can be cited *pro* and *con*.

Theodore Ziehen,¹¹⁶ presents the results of a systematic observation extending over two years, and embracing the employment of over 18,000 single doses of opium in the treatment of various forms of mental disturbance. The treatment embraced over 40 cases of melancholia, 4 of typical mania, and 50 of various forms of paranoia. Of the 43 patients of melancholia, 2 died of intercurrent diseases, 2 were removed by relatives, and 31 recovered. Although the author admits that this success certainly cannot be said to be due wholly to the opium, as good food, rest in bed, etc., had a great share in producing the favorable results, still the beneficial effects of the opium cannot be denied, in his opinion. In those cases which did not improve under the use of opium, 6 were afflicted with a marked delusional state, with excessive mental disturbance. The opium was wholly given by the mouth, and the constipation, which was observed in about 50 per cent. of the cases, was successfully relieved by the fluid extract of cascara sagrada, and the diarrhœa, which was observed at the height of the treatment and at the suspension of the opium, by tincture of koto, 10 to 20 drops. Ziehen is of the opinion that it would be perfectly justifiable to continue the use of the opium for at least a year, if it could be shown that the intellect was not being impaired by its employment. In the cases of mania, no good effects followed the use of the opium. In this the author thinks the bromides and hyoscine could be used to better advantage. In simple paranoia no beneficial influence was observed; but in the case of paranoia with hallucinations, where cerebral exhaustion could be shown to be a causative element, opium seems to be of value. The query

as to the favorable effects of opium in purely affective melancholia and in paranoia hallucinatoria has had various answers. There can, however, it seems, be no specific answer: the vasomotor effect of opium to relieve in larger doses the tetanic state of the peripheral vessels must be taken into account in certain cases. The most-essential point, however, is the directly sedative effect of the opium, especially upon the cortical layers, which saves the power of the patient and gives time for other substantial treatment.

Bell and Lemoine³⁶¹_{Jan., Mar.} have also given the results of their observations upon the use of opium in the treatment of melancholia. Their methods are summarized as follows: 1. Rest in bed for a prolonged period. In this way cerebral anæmia is best prevented and the patient removed from the disturbing influence which often forms the basis of delusions. 2. Every morning the patient is given on waking a glass of Hunyadi water, preventing in this way the disturbing effects of constipation. 3. Tincture of nux vomica is given in small doses twice daily before the two principal meals of the day. 4. Laudanum is used in progressive doses, commencing with 5 drops and increasing 5 drops each day until distinct improvement in the patient's condition was observed. The writers have never had occasion to exceed 200 drops daily, but say they would not hesitate to increase the dose beyond this point if necessary. After there has been a marked improvement observed in the physical condition spray-baths of short duration are employed.

Therapeutical Observations in Insanity.—Umpfenbach¹¹⁸ presents an interesting communication concerning some therapeutical measures which have been employed in the asylum at Andernach, Germany. His report opens with some remarks upon forced alim-entation. The author gives preference to feeding by the nose by means of an elastic catheter. In the employment of hypnotic measures he claims to effect excellent results with the wet pack, which he thinks acts especially upon the circulation of the blood, and, by reflex action, on the peripheral nerves. He has seen it produce sleep in patients with a very high degree of excitement. In some cases it became necessary to repeat the application frequently for a period extending over half a year, but no diminution in its effects were observed. He has nothing new to say about the new drug hypnotics. Sulphonal he has used but to a limited degree. Hyoscine he regards as a cheap, convenient, and beneficial

hypnotic, but has not that confidence in it that Kobert, Salgo, Köhlwetter, Kraus, and others of his German *confrères* have shown. His experience would lead him to the conclusion that hyoscine is contra-indicated in cardiac diseases.

Alimentation.—Lailier, the apothecary of the asylum at Quatre-Mares, near Rouen,³⁶¹ discusses the feeding of patients who, through the consequences of their condition, are insufficiently nourished, or who, by reason of delusions, refuse food. For cases in which there is insufficient nutrition, but who will take food, he recommends dry peptones dissolved in Malaga wine, and especially the following composition: Raw, chopped meat, 100 grammes (3 ounces 2 drachms); powdered sugar, 40 grammes (1 ounce 2 drachms); Malaga wine, 40 grammes (1 ounce 2 drachms); tincture cinnamon, 5 grammes (1½ drachms). To avoid the danger of tæniæ he uses mutton, or the chopped meat may be brought for a minute to a high temperature. Meat-powders he has found to be efficient and may be administered in any convenient vehicle. For feeding by a tube he recommends the following daily ration: Four eggs, 2 litres (2 quarts) milk, 250 grammes (8 ounces) Bordeaux wine, 30 grammes (1 ounce) meat-powder, with an addition, the importance of which should not be forgotten, of 10 grammes (2½ drachms) common salt.

Pilocarpine in Insanity.—Two cases are reported of the use of pilocarpine in mental excitement. The first, by Willoughby, of London,⁶ is that of a gentleman who had been working at high pressure for a long period, until at last he broke down. There was insomnia, loss of appetite, and, when seen by Willoughby, his condition was one of delirious excitement; hot, dry skin, throat and mouth parched, and general temperature 104° F. (40° C.). He was given at first 25 grains (1.62 grammes) chloral, 15 minims (0.92 cubic centimetre) liq. opii sed. in a glass of milk. At the end of six hours his condition had not changed; he was still talking incessantly and more incoherently than before. One-sixth of a grain ($\frac{1}{6}$ gramme) pilocarpine was injected in the arm at 10 P.M. In five minutes profuse perspiration and salivation commenced; the next morning he was calm, skin cool, temperature normal, head clear, and he had seven or eight hours of refreshing sleep.

The second case is reported by Lyon, of the Bloomingdale Asylum, New York.³² Aug. 17 The case was one of maniacal excite-

ment, with delusions and some tendency to hystero-epilepsy. On the second morning after her admission to the asylum she had a convulsive seizure which had the characteristics of hystero-epilepsy; temperature was $103\frac{1}{2}^{\circ}$ F. (39.66° C.), pulse 150 and tumultuous. She was given inhalations of amyl nitrite and ether, which only temporarily quieted the convulsive condition; other measures were tried, but without effect. She was finally given $\frac{1}{4}$ grain (0.008 gramme) of the muriate of pilocarpine hypodermically, which was soon followed by profuse perspiration and rapid fall of temperature; the convulsive movement ceased, consciousness gradually returned, and her condition was followed by quiet sleep. No further convulsions had occurred in this case at the time of the report, and the condition of excitement has been replaced by a passive state.

Electro-Therapeutics.—Jules Morel,⁶⁸⁵ after presenting quite *in extenso* the physiological and experimental bases of the therapeutical application of electricity in mental diseases, reports that in 15 cases of melancholia the galvanic current produced remarkably good results. Tigges, who is quite freely quoted by Morel, reports a series of 16 cases of melancholia where the results were favorable but less striking, and in the third series, 38 cases, but partial results were obtained. Tigges also treated 27 cases of melancholia with stupor; in 3 of these there was marked success, in 7 an amelioration of the condition followed, in 13 there was only temporary improvement, and in 4 cases no results were observed. In 15 cases of mania the same observer met with no instance of recovery, but is of the opinion that the galvanic current produced an improvement in some of the conditions present in the case. In chronic mania and in dementia but temporary and partial results were reported. In general paralysis Hayden reports favorable results in a case of only three months' standing, and Hitzig and Schüle also confirm this in recent cases. The report concludes with reference to the employment of galvanism and general faradization in epilepsy, hysteria, and hypochondria.

Treatment of Insanity by Hypnotism.—Before the meeting of the Physiological Section of the British Medical Association in August, 1889,² Auguste Voisin presented a communication on the treatment of insanity and neuroses by hypnotic suggestion, and on the application of the method to the moral and instinctive perversions of backward and imbecile children. In his services

at la Salpêtrière and also in his private practice he has been able to develop the method, and with apparently successful results. He stated that catalepsy ought to be carefully avoided, because the hypnotized individual should be able to preserve the use of his senses, especially that of hearing. He was convinced that hypnotism was only useful when it was possible to make use of suggestion. By this treatment he claims to have cured persons suffering from hallucinations and delusions, and from disturbances of the special and general senses, suicidal ideas, and acute and furious mania. Under the use of this method cases of insanity were also cited which had only been calmed for brief periods. Suggestion had also been successfully applied in dipsomania and morphinomania. The speaker had also been able to cure obstinate cases of onanism, and had under this method completely transformed the habits of thought of depraved youths. Reference was made in the ANNUAL of 1889 to Voisin's application of suggestion for moral perversities. He claims, in his address before the Section, to have succeeded in curing amenorrhœa. He particularly insists on this point, as proving that it is possible to influence by suggestion the functions of the sympathetic system. The claims of Voisin seem to have been received by the members of the Section with considerable incredulity. Yellowlees, of the Royal Gartnavel Asylum, Glasgow, says that his attitude of mind toward the paper was one of simple amazement. Here was something that cured mania, banished hallucination, cured the love of drink and morphine, stopped masturbation, improved memory, made imbeciles wise and bad folks good, and it resembled nothing so much as the waving of a conjurer's wand and saying to disease, "Begone!" Voisin must not deem the members of the Section disrespectful if they were a little incredulous as to these wonderful results. Yellowlees's expressions were shared by other members of the Section, while Tuckey,¹⁰²¹_{Dec.} who has published notes of his investigations at Liébeault's clinic, Langdon Down, Robertson, and others confirm many of the claims made by the author of the paper.

At the same meeting Bateman read a paper upon hypnotism which entered into an elaborate criticism on certain experiments made at la Salpêtrière. Eugene Konrád⁵⁷_{Apr. 14, 22} contributes an extended article upon hypnotic suggestion and the treatment of mania. He shows that, according to the education of the indi-

vidual, he believes that his abnormal mental process and physical sensations are produced by poison, witches, magnetism, and various other occult influences, and it is therefore not at all surprising that cases are occasionally met who may believe hypnotism to be the cause of their troubles.

The author raises the question whether there may not be a natural connection in certain cases between the two. Delusions spring from hallucinations and impulsive thought; in this consists the analogy between hallucination and suggestion. The hallucination really does nothing but what the hypnotizer does, viz., to suggest. The hypnotized and the hallucinated act alike: they follow the suggestion. In both there is an inability to call up thoughts which correct the suggestive influence and use them as an opposing element. The difference is that in the hypnotized individual this state is only a temporary one, which is easily removed. The author then gives an interesting theory as to the possible cerebral processes underlying these two states, and, finally, after calling attention to the danger of hypnotism from its close analogy to insanity, he concludes that only for therapeutical purposes can one justify himself in using hypnotism and suggestion.

Burot²⁴¹ reports a case of the cure of hysterical mania with impulses and hallucinations, together with suicidal tendencies, by hypnotic suggestion. The patient had paroxysms of great excitement; there were delusions of suspicion and fear. At the menstrual period she was especially agitated. At the time of consulting Burot, in December, 1887, there were delusions and also hallucinations of hearing. She was constipated, and menstruation was irregular and scanty. After a month and a half's treatment by suggestion there was a decided amelioration in her condition; her appetite had returned, her sleep was quiet and continuous. She was then removed from under the observation of the reporter. At the end of six months she was returned with the hope that a positive cure might be effected. Burot says that "perceiving that direct suggestion did not have much influence, I conceived the idea of resorting to a subterfuge. While applying my hand to her forehead, and while she was slightly under the influence, I made her repeat this sentence: 'I shall be able to overcome my vicious ideas, and I shall know how to govern myself, and nothing shall prevent me from going to stool regularly

every day. I shall again become as healthy as I was at the time of my marriage.' At first she found great difficulty in repeating these phrases, but by degrees she was able to repeat the formula without difficulty. At the same time her memory returned, the delusions and hallucinations disappeared, her countenance resumed its former appearance, and she took up again her old habits of order and industry; the constipation disappeared and menstruation was usual and regular."

Voisin, of la Salpêtrière,²⁴¹ reports the case of a young woman, aged 30 years, who had lypemania, with suicidal ideas, chorea, and hysteria. The chorea was consequent upon a severe fright during the Franco-Prussian war, when the house occupied by the patient was burned. The mental disturbances dated from 1881; the suicidal tendencies were very marked and there was always constant headache. Various remedies had been tried for the relief of the chorea as well as for the mental disturbance. As a last resort, she was brought to Voisin's clinic. Hypnosis was readily produced by placing the hand on the forehead and holding a prism before her eyes. The first suggestion was not to have any more pains in the head, gloomy ideas, or tremblings of the upper right limb. The hypnotic sleep lasted half an hour. Two days following, the pain in the head disappeared and there had been no trembling. The same suggestion was made as at the first hypnosis, with the continual suggestion that she would certainly be cured, and that she should allow herself to be put to sleep by the operator when he wished it. Two days following this there was still a further improvement, though there had, however, been a slight return of the pain in the head. She was again treated by suggestion. Eleven days after the first treatment all morbid phenomena had disappeared; she was in good spirits, and had a woman's interest in her household affairs. At the expiration of ten months the cure continues well established. At the conclusion of this article the writer gives a series of 22 cases, including various neuroses, 9 cases of insanity, instances of perverted moral instinct, etc., upon which he has reported since 1884, of whom 19 remain well.

The demonstrations of Charcot, Voisin, Forel, Bourru, Bernheim, Luys, Liébeault, and others in this field seem to have established the claim of hypnotism as a powerful agent in the treatment of nervous diseases. Whether all the claims that have been made

will stand the test of time and careful examination remains to be seen. It is not at all improbable that some of its enthusiastic advocates have been carried away by apparently almost miraculous results which they have obtained, and have, with the most-honest intentions, reported cures which will not stand a careful investigation. As regards the treatment of the insane by this method, it seems pretty well established that only certain forms of mental disturbances are susceptible to such an influence. These seem to be included in the classes known as the hysterical and hypochondriacal, although instances are not unknown in which active mania and profound melancholia have yielded to hypnotism. It should be borne in mind that this method is not without its dangers, and that instances have already arisen, and are liable to arise again, where absolute harm has been done, especially when attempts have been made to apply it to persons of feeble or unbalanced intellect.

Insanity Following Surgical Operation.—C. T. Dent¹⁶⁶ says that so far as his researches extend little attention has been paid to this subject. Insanity, in some degree as a sequela of surgical operation, though certainly rare, is less uncommon than is usually supposed. He then shows that mental impressions may be produced in three ways: by anticipation, by actual operation, and by after-effects. A more-important factor in producing mental disturbances is mental reaction. Without attempting any classification of the degrees of mental disturbance, he enumerates certain arbitrary grades which he proposes to use for the purpose of his argument. Taking them in an ascending scale, he mentions emotional disturbance, hysterical disturbance, loss of control, unreasonableness, hallucinations, and mania in its various forms, and he then proceeds to show how, in the various modes which he cites, operations may affect the mind, and gives illustrative examples. Reference is made, in the course of the article, to the paper of Savage, late Superintendent of the Bethlehem Royal Asylum for Lunatics, London,² upon insanity following anæsthetics. The cases which he has collected are of much interest, and some of them are quite remarkable in their clinical history. As Dent has doubtless learned since reading the paper of Thomas and the numerous cases which its discussion has called out, the conclusion which he makes, that cases similar to which he has recorded are not particularly rare, is correct.

The paper of Thomas⁵⁹_{Apr. 20} upon acute mania, melancholia, and hypochondriasis as sequelæ of gynæcological operations, read before the New York Academy of Medicine, is an interesting and valuable contribution to medical literature, and the discussion which it evoked, both at the time and subsequently, shows that it was only necessary to start the reference to cases of this character to bring forth reports of numerous illustrative instances. Thomas reported 6 cases. He said that the literature on the subject was scanty, but that for a year or two it had been discussed somewhat in Germany; that the entire number of cases reported, including his own, amounted only to 26. He then propounds the following questions: 1. Are these 26 cases of mania and melancholia really due to the operations which immediately antedated them, or did they follow as mere coincident states? 2. Any great mental strain might be followed by mania. Was it at all remarkable that, in the vast number of gynæcological operations performed the last quarter of a century, 26 cases of this malady should occur? 3. If mania, which followed operations in the 26 cases, was the consequence of the operation, how was the tendency to this accident to be avoided in the future? 4. Were the operations in gynæcology any more likely than other surgical operations to disturb the condition of the mind? Polk thought that women were more disposed to maniacal disturbance after operations, especially upon the genitals. If he were asked why, he would answer that in his opinion women are more emotional. For this reason he prefers not to operate upon cases that had previously shown any abnormal mental action. He regarded it as a simple mania, and not, as some had suggested, due to the toxic influence of the drugs employed; for example, the anæsthetic, iodoform, or the bichloride of mercury used in antiseptic dressings.

Landon Carter Gray was of the opinion that to Thomas belonged the credit of describing a new genus of insanity; he thought it better to call it post-operative insanity, which distinguishes it from post-febrile insanity. In this opinion he is at variance with the teachings of H. C. Wood,¹¹²_{Dec} who is inclined to regard traumatic insanity, insanity following operations, and post-febrile insanity as belonging to the same class. An editorial¹⁶¹_{Nov} calls attention to the analogy between these cases and the conditions known as puerperal mania.

Mairet, of Montpellier, ¹⁴ has collected 25 cases from his personal experience, from which he draws the following conclusions: 1. That it is in those individuals who are predisposed by hereditary or other grave causes (alcoholism, infectious diseases, etc.) that surgical operations give rise to insanity. 2. In the constituent elements of an operation that might act on the brain were two most-important ones, namely, the anæsthetic and the degree of surgical traumatism, with its after-effects, of which disturbed nutrition plays a very important part. 3. When the predisposition is considerable the anæsthetic alone may produce insanity, or it may result after even minor operations. It is, of course, necessary, the writer says, to take into consideration the mental state of the patient prior to the operation, especially in those graver ones where questions of life and death are frequently involved.

HYPOCHONDRIASIS.

Mendel ¹⁵ contributes an extended article upon hypochondriasis in women. He defines hypochondriasis as a functional disease of the brain, whose chief symptom is a fear and anxiety concerning the patient's bodily condition. He divides hypochondriasis into three forms: 1. That in which there is simple fear and anxiety as to a permanent disease or death, in which the patient has no definite symptoms to complain of, or in which but limited and trifling symptoms are looked upon as extensive and incurable maladies. This form, he says, may be principally termed nosophobia. 2. The second form presents, in addition to fear and anxiety, vague sensations in the different organs of the body, which may be termed hallucinations of sensations in these organs; for example, feelings as though the abdomen was swollen, the head soft, etc. These sensations are probably produced by an irritation of the centres of these various organs in the cerebral cortex. This second form may be called hypochondriasis with hallucinations of the organ-sense. 3. The severest form, in which there are in addition disturbances of the higher organs of sense. One or more of the senses become perverted. At the same time the patient recognizes that the hallucinations proceed from the perverted senses and are but diseased perceptions. Mendel is of the opinion that hypochondriasis is not an uncommon condition in all ages in women. The first type is much rarer than in men; the second

type has apparently been as frequently observed in men as in women. Not infrequently the hallucinations of the organs of sense may be referred to the sexual apparatus; somewhat more rarely the hallucination is referred to the spinal system or to the heart and lungs. According to the author's experience, the third form is more frequently observed in women than in men, and he is of the opinion that the disturbances of the higher senses observed in this form are due to the pathological changes in the sense-centres. Frequently hysteria complicates hypochondriasis. The commencement of the disease is usually slow, the course irregular, and duration variable from a few weeks to one or two years, and eventually may terminate in recovery or relapse into the chronic form, or merge into some other mental disorder. The prognosis is, however, usually good. Internal medication he finds, as a rule, of little value. Hydrotherapy, massage, and gymnastics are of value. Gynæcological treatment is to be avoided.

Régis, Aug. 7th 1904, at the International Congress of Mental Medicine, presented the results of some observations on hypochondriasis, especially as associated with general paralysis, in which he points out some peculiar characteristics of this condition as associated with the earlier manifestations of the disease.

MELANCHOLIA.

Meynert¹¹⁸ presents some observations upon melancholia. He believes it to be a symptom of trophic disturbances of the anterior brain and the opposite to mania. In the latter there is an exalted disposition and increase of the cortical functions of movement and megalomania. In the former there is a sad disposition, a decrease of movement, and micromania, the delirium of which is of self-reproach. For different reasons he concludes that the basis of this depressed disposition lies in the want of functional hyperæmia of the cortex, which latter state, if exaggerated, produces the exalted disposition of mania. He then proceeds to point out the difference between melancholia and various mental conditions which may be mistaken for it.

A clinical study of this same condition is presented by Mendel.⁷⁵ He divides melancholia into three forms: 1. Hypochondriacal melancholia, showing itself especially in sensual feelings. 2. Intellectual melancholia. 3. General melancholia, where

sensual and intellectual feelings are morbidly changed. He finds that the hypochondriacal form is much more frequent in men than in women, as is also general melancholia, while the intellectual form is more frequently observed in women. As to age, it is more commonly observed between 20 and 30. The hypochondriacal form is most prone to relapse, following which comes general melancholia. As to therapeutics, he remarks that the opium treatment has proven quite satisfactory in the intellectual form, but that in the hypochondriacal variety the results were not favorable to this method of treatment.

SPINAL SYMPTOMS IN THE CONVALESCENT STAGES OF ACUTE MANIA.

H. Schermer ⁸⁴_{Apr.-May, 20} contributes an article upon observations in 4 cases of acute mania, in all of which, during the stage of convalescence, the patellar tendon reflex had entirely disappeared, even after trial by Jendrassik's method. In regard to the patellar phenomenon, he adopts the view of Erb that it is a reflex, having for its centripetal nerves the tendon nerves of Sachs and branches of the anterior crural nerve. The reflex centre is in the upper lumbar region of the spinal marrow and its centrifugal course is by motor branches of the anterior crural nerve. This explains the absence of the tendon reflex in diseases of the spinal cord; and the author believes that in his cases the posterior columns were affected near the posterior nerve-roots, and, as according to Meynert the functional disturbances in the nervous system generally coincide with vasomotor ones, he believes that the same vasomotor changes which caused the cerebral trouble were at work in the posterior columns and produced the absence of the tendon reflex.

GENERAL PARESIS.

Several articles have been contributed during the year upon this always interesting disease, and not the least interesting and valuable from a clinical stand-point is a study of the early symptoms in a paper read by Charles F. Folsom ⁸⁹_{Oct. 18} at the annual meeting of the Association of American Physicians in September, 1889. He shows how scanty is the literature on the early or initial symptoms of this disease. It is usually difficult for friends to describe the earliest traces which they observe. He gives a few illustrative examples. One, a distinguished pianist who lost his fine appre-

ciation and nice touch; another in which the wife spoke of her husband as being the opposite of himself; another of a daughter who said her mother did not appear so thoroughly a lady as she had always been. One was said to be different from himself, but the change was said to be indescribable; one was a little slow in speech and gait; one recognized his own condition and said he had not good will-power, and another described his case by saying he lost his presence of mind. He shows how difficult it is to characterize, or even, without prolonged study and observation of the case, to detect the earliest changes in the mental and physical state of the patient, which may be said to be the prodromal period of paresis. He shows how it may be confounded with Bright's disease, with hysteria, epilepsy, lead or malarial poisoning, prolonged abuse of opium, alcohol, chloral, and the bromides. There is, however, he considers, a peculiar, indescribable kind of mental impairment, which, with vague physical deterioration, if not obscured by other conditions, may be sufficient to decide the diagnosis.

It is unfortunate that Folsom and other writers who have devoted themselves to the study of the earliest symptoms of so grave a disease are unable to more graphically point out the clinical features of those early symptoms. No one, however, who has not had an opportunity of studying a series of cases can appreciate the great difficulties which stand in the way. After an extended experience with these cases, I can recall but few instances (less than 1 per cent. in some hundreds of cases) where, even after the disease had advanced to such a stage that asylum care was necessary, it has been recognized by the physicians who committed the patient. We must therefore despair of any opportunity for collecting data as to the early symptoms of the disease, until the general profession become educated to an appreciation of the meaning and importance of those symptoms, and are able to distinguish general paresis from other forms of mental disturbance.

Recovery from Paresis.—Wendt¹⁸ reports an interesting fact of the apparent recovery from general paresis after a residence in the asylum of six and one-half years. The diagnosis seems to have been carefully made, and some of the patient's letters are given as illustrative of his condition. At the present time, nineteen years after the beginning of the disease, he is engaged in practice as a

physician. The author admits that there may be some traces of mental weakness remaining.

Voisin,³⁵ answers the question "Is it possible to cure general paresis?" in the affirmative. He professes much faith in the reported cures cited by various authors, and deprecates their frequent interpretation by the existence of prolonged remissions or by errors in diagnosis. He refers to several instances which he quotes from the authorities, and which he takes from his own personal experience. Referring to a certain number of cases of apparent spontaneous cure following suppuration, he points out that this is a suggestive fact and the basis of an effective form of treatment, namely, setons and the cautery, etc., and refers to illustrative cases confirming his statements.

Trophic Changes in Paresis.—Féré,⁴⁵² asserts his belief that general paralysis of the insane is not an entity or fixed malady, with a certain fatal progress and with lesions always the same. He then proceeds to consider some of the trophic disturbances, as the hæmatoma auris, the brittleness of the bones, and some others which have been frequently observed. Less familiar are the trophic disturbances of the skin, and for this reason the author gives an accurate description of two different cases with trophic changes. The first of these had ichthyosis and general troubles; the second, vitiligo. He also reports a case of general paresis with hemiatrophy of the tongue. With regard to the pathology of the cutaneous troubles, he remarks that Leloir and Déjerine have been able to show the existence of peripheral nervous lesions, but intimates that it would be difficult to establish the independence of these lesions from pathological changes in the central nervous system.

Trephining in Paresis.—T. Claye Shaw, Lecturer on Psychological Medicine, St. Bartholomew's Hospital,² reports a case of general paresis in which the prominent symptoms disappeared after trephining. He says: "Whether general paralysis is a disease *sui generis* or not, it is certain that the pathological appearances point to irritative (probably inflammatory) processes in the upper layers of the convolutions in the earlier stages, and to pressure signs from the presence of fluid in the later." To relieve the pressure, and to produce in the brain a condition analogous to that produced by nerve-stretching in ataxy, Shaw proposed trephining.

In the case reported the diagnosis was confirmed by Ferrier. The operation was performed under strict antiseptic precautions. Two disks of bone were cut out and the intermediate bone removed, making an opening $1\frac{1}{2}$ inches (37 millimetres) long by $\frac{3}{4}$ inch (18 millimetres) wide. The dura was opened and a considerable quantity of subarachnoid fluid let out. The operation was made July 28th.

At the time of the report there was such decided improvement that the patient was no longer considered insane, and the physical symptoms had also been considerably ameliorated. The patient had, moreover, had no return of the convulsive attacks which had occurred from time to time before the operation.

Suspension in General Paralysis.—A method which seeks to apply to paresis the treatment which has been found of so much value in ataxic troubles has been put into operation by E. Régis in conjunction with Friese.¹⁸⁸
Oct. 20

The report of the applications of suspension in paresis made by these gentlemen narrates the results obtained in 12 cases of paresis and in 2 or 3 cases of other forms of insanity. The apparatus used is similar to that ordinarily employed, except that the occipito-mental sling is attached to a beam or cross-piece distinct from the one to which the axillary bands are attached. With this arrangement the degree of tension upon the head and cervix can be regulated independent of that made upon the axillary bands. The trials of suspension reported in this paper extended over a period of one month, viz., April 5th to May 5th, 1889. The suspension was continued in each case for at least three minutes. Two minutes were devoted to axillary suspension alone and one minute to combined axillary and occipito-mental suspension. All of the patients, with two exceptions, lent themselves willingly to the experiment. None showed any ill effects, nor were any observed in a larger number of cases not reported in this paper. The net results have been an increase of functional activity, physical and mental. Physically, after the third or fourth *séance* marked suppleness and increased agility were manifested. A decided diminution of tremor has been observed, as also of the ataxic gait and the disturbance of speech. The improvement in these respects was, however, but transitory, passing off in a few hours after the *séance*. Mentally, increased loquacity and mental

activity were observed. Suspension was also tried in other cases, and the author is led to believe that states of depression can be advantageously modified by this treatment.

Syphilis and Paresis.—A. Morel-Lavallée,¹⁰⁰_{Oct. 19} in the course of an article upon syphilis and insanity, comes to the conclusion that, as regards paresis, syphilis produces a pseudo-paresis which is very hard to distinguish from true general paralysis. He believes that true general paralysis, where syphilis is but a concomitant element, or at best but a secondary cause, is not in the least influenced by specific treatment, while in syphilitic pseudo-paresis a recovery may be anticipated if organic structural changes have not been produced

Paresis of Long Duration.—Noyes²⁴²_{Aug.} reports an interesting case, with autopsy, of paresis of nine years' duration, and Sinkler and Brush²⁷⁸_{Apr.-July} report one of fourteen years' duration. The writer now has a case under care whose history extends back over eight years.

Insanity of Old Age.—Rouillard,¹⁰⁰_{July 12} has written an interesting article upon the insanity of old age. He places special stress upon care in diagnosis, and shows that not all insanities of old age are hopeless; cautioning the observer lest in giving an unfavorable prognosis he is afterward brought face to face with a recovered patient.

Insanity of Puberty.—In the course of some valuable clinical lectures upon this subject, Mairé⁷⁵_{Oct. 16} distinguishes two groups as follows:—

1. Insanity of puberty with arrest of mental development.
2. Simple insanity of puberty, which he subdivides into (a) melancholic stupor, (b) choreic mania, (c) impulsive mania, and (d) hysterical mania.

Suggestions for a New Classification of Insanity.—Macpherson, senior assistant at the Royal Edinburgh Asylum,²⁷⁸_{Jan.} presents some suggestions for a new basis of classification. The suggestions are founded on Hughlings-Jackson's theories of evolution and dissolution.

Taking the three great divisions of mind—feelings, volitions, and intellect—as the points of departure, Macpherson proposes, as the basis of an extended classification of disordered mental states, the following dissolutions:—

I. Dissolution of the emotions or feelings, under which he
classes (*a*) melancholia, (*b*) mania.

II. Dissolution of the intelligence.

III. Dissolution of volition.

DISEASES OF THE BLOOD AND SPLEEN.

BY FREDERICK P. HENRY, M.D.,
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GENERAL CONDITIONS.

THE methods hitherto employed to determine the chemical reaction of the blood have all been faulty. This is proved beyond doubt by Kraus, ²⁷³_{Oct.} who has ably investigated this difficult subject. He found, ⁴⁰⁵_{v.10, N.3} that in healthy individuals the degree of alkalinity of the blood varies considerably. In fever it is diminished, but whether from auto-intoxication with acids of unknown nature, or from the increased temperature of the blood, cannot as yet be decided. In the blood of febrile patients there is much less than the normal amount of CO₂. With natural defervescence it soon reaches the normal point, but if the temperature is reduced by antipyretics this does not occur. In 3 cases of diabetic coma, studied with reference to the reaction of the blood, the results were not uniform. In two of them the alkalinity was decidedly diminished, so that an acid intoxication of the blood might fairly be inferred. In the third case the reaction was normal. In phosphorus poisoning the alkalinity was decidedly diminished, this being probably due, as suggested by H. Meyer, to the increased destruction of albuminates, which, coinciding with diminished oxidation, would give rise to the formation of numerous intermediate products of acid reaction. In chlorosis and leukæmia nothing definite concerning the reaction of the blood was ascertained.

The generally-accepted belief that red blood-corpuscles are destroyed in the liver and converted into bile-pigment is confirmed by Anthen, ⁸¹⁹_{Nov.18} who has demonstrated that liver-cells possess the faculty of incorporating hæmoglobin with their substance and converting it into a pigment closely resembling that of the bile. This only takes place in the presence of glycogen, or grape-sugar.

The origin of pigment in the blood and solid tissues, whether normal or pathological, has been exhaustively studied by Neu-
(E-1)

mann²⁰_{Nov.} and M. B. Schmidt.²⁰_{Nov.} The former, in the course of his article, reviews the literature of this important subject from the time of Meckel, who, in 1847, was the first to discover pigment in the blood, to the latest researches of Laveran and his followers on the blood in malarial fevers. The pigments of the body may be broadly divided into two classes: those which give an iron reaction and those which do not, the first being known as *hæmosiderin*, a name conferred upon them by Neumann. A question of fundamental importance is whether these differently-reacting pigments have a common origin. Schmidt answers it in the affirmative. The iron reaction is, in his opinion, only a stage in the progressive development of granular pigment. There are numerous other points of pathological interest in Schmidt's valuable paper, to which want of space forbids a more extended notice. Pilliet,¹⁶⁴_{July} reviews in a brief but interesting manner, the subject of melanæmia, and believes that the presence of pigment in the blood is more common than is generally supposed.

The origin and function of those formed elements of the blood, known as blood-plates, blood-plaques, and hæmatoblasts, are questions of great physiological interest, upon which opinions have widely differed. Löwit,²⁰_{Sept.} in an elaborate paper based upon numerous experiments, defends the view that these bodies do not exist in normally-circulating blood, but are products of retrograde metamorphosis. He found them invariably absent from blood which was expressed from the punctured finger into oil of a certain specific gravity and temperature. The mixture of oil and blood must be examined without a cover-glass, for the mere contact and pressure of the latter are sufficient to produce the blood-plates in large amount. Löwit regards these bodies as products of the destruction of the white blood-cells or as precipitates from the blood-plasma. The blood-plates have undoubtedly been seen circulating in the vessels (for example, by Laker, in the bat's wing), but Löwit shows that the unnatural conditions of pressure and temperature involved in all such experiments are sufficient to produce them. A careful study of Löwit's paper will amply repay those who are interested in this important physiological question.

Spronck³¹⁹_{Aug.-Sept.} has observed that the leucocytes multiply by karyokinesis in the circulating blood of adult warm-blooded animals, including man. In leucocythæmia this process is increased

to such an extent that Spronck compares it to that which takes place in the formation of neoplasms, and speaks of the affection as a leucocythoma sanguinis.

An admixture of the blood of the portal system with that of the general circulation is believed by Stockton^{61 Aug. 34} to give rise to certain toxic symptoms which in their lightest forms are expressed by the term biliousness. As is well known, there is free anastomosis between the portal and the general circulation, but, under normal circumstances, the pressure in the portal vein is so low as to preclude the diversion of its blood from its course through the liver. In obstruction to the portal circulation, the pressure in the portal vein may rise to such an extent as to equal or surpass that of the vena cava inferior, and, in the latter event, the portal blood, "with its peptones, its bile, its animal alkaloids, and all its poisons, finds its way in greater or less proportion into the general circulation, and toxæmia is the result." In this way Stockton would explain the coma which sometimes precedes the fatal event in cirrhosis of the liver. In the discussion of Stockton's paper it was objected by Osler that extreme cirrhosis of the liver was occasionally found at the autopsies of individuals who, during life, had presented no symptoms whatever of toxæmia. The same was true of fibroid obliteration of the portal vein, which, of course, would divert all the portal blood into the general circulation.

Cuffer and Sollier^{92 Oct. 10} describe a condition which they call general venous congestion, and report 2 cases illustrative of it. In both there was marked erythematous congestion of the skin and mucous membranes, swelling of spleen and liver, albuminuria, and various nervous symptoms indicative of congestion of brain and spinal cord. In the absence of cardiac disease they believe these cases represent a special diathesis,—*diathèse congestive veineuse*. In some respects the cases seem to the writer to bear a decided resemblance to scorbutus.

Danilewsky^{208 July 4} has proved that the presence of parasites in the blood is much more common than is generally supposed. In cold-blooded animals—frogs, lizards, turtles, and fish—he has seen forms belonging to the flagellate infusoria and gregarini. He believes the low temperature of the blood of these animals to be particularly favorable to the development and multiplication of these protozoa, although he has found them also in every species

of bird that he was able to procure at Kharkoff. The great majority of the birds examined—more than 300—did not seem to suffer from the presence of the parasite; but 4 or 5 died, and presented lesions identical with those observed in fatal cases of malarial fever, viz., swelling of spleen and liver and great accumulation of pigment in these organs. Another point which brings this parasite of birds into close relation with the plasmodium malarie is that at one stage of its development the cyst in which it is contained, ruptures and gives exit to free flagellæ. Recent researches of Sacharoff ²⁰⁸_{July} go to show that the microbe of relapsing fever, the spirillum of Obermeier, hitherto supposed to be an independent organism, is but one stage in the development of a larger hæmatozoon.

Oppenheimer ⁶⁰_{Nov. 22 to 24} contributes an elaborate article on the practical value of the hæmacytometer and hæmoglobinometer. It embodies in tabular form the results of numerous examinations, and ends with an expression of the hope that the above-named instruments may come into more general clinical employment. Oppenheimer was particularly struck with the fact that in many individuals of pallid complexion the blood was found in a normal condition, and explains the anomaly by the theory of an irregular circulation. Every careful observer who has made many examinations of the blood must have been impressed, as was Oppenheimer, by the frequent contrasts between the facies of the patient and the state of his blood, and will probably accept the explanation which he offers and supports with great ingenuity. Such facts justify the doubts with which hæmatologists receive the numerous reported cases of chlorosis in which there has been no examination of the blood.

CHLOROSIS.

The symptoms and signs of chlorosis are so well known that cases of this condition are rarely reported except for the purpose of demonstrating arithmetically the effect of some therapeutic agent upon the blood-corpuscles or to call attention to some unusual symptom or complication. For example, Vergely ¹⁸⁸_{Aug. 18 to Sept. 3} devotes an elaborate article to the consideration of venous and arterial thrombosis occurring in the course of chlorosis, although an extended literary research has furnished him only 14 cases of the former and

2 of the latter. As they are all from French sources it is permissible to suppose that the subject is by no means exhausted. Among his cases are 1 observed by himself and the 3 reported by Perret, noticed in the *ANNUAL* of last year. It might be hypercritical to say that examinations of the blood in these cases were conspicuous by their absence, but for the fact that most hæmatologists regard chlorosis as the expression of a definite state of the blood characterized by a normal number of red corpuscles, in each of which the hæmoglobin is more or less deficient.

The conclusions of Vergely are the following: 1. In an early stage of chlorosis thrombosis may occur in any part of the venous system. 2. Thrombosis may also occur in the arteries of the base of the brain, especially in the district of the Sylvian artery. 3. In the two cases of arterial thrombosis, no lesion, gross or minute, of the vessels or the organs to which they were distributed, could be detected. 4. In chlorosis, as in cachectic conditions generally, venous or arterial thrombosis may occur without being preceded by the clinical signs of vascular inflammation.

As already hinted, thrombosis in the course of chlorosis is such a rare event that the chief interest of these observations lies in their bearing on the general question of intra-vascular coagulation.

The relation between chlorosis and menstruation has always attracted attention, and is the subject of a paper read before the Obstetrical Society of London by W. Stephenson, of Aberdeen,^{2, 10} his conclusions being based on an analysis of 232 cases. In brief, they are that "imperfect evolution of menstruation, as evidenced by scantiness of the flow and irregularity of the periods, was as regular a feature of chlorosis as the imperfect evolution of the red corpuscles of the blood. These constants were not related to each other as cause and effect, but were independent one of the other. At the same time there was a close relationship between them, whereby the reproduction and development of the red corpuscles of the blood was governed by, or formed part of, the menstrual cycle; and both were influenced by a greater rhythmic action which determined the time and activity of development, growth, and reproduction."

In the abstract of Stephenson's paper there is no account of an examination of the blood in any of his numerous cases.

Under the head of "Chlorosis," Tissier⁷ reports a fatal case of anæmia, the patient being a female aged 18 years. At the autopsy the heart and large arteries were found to be much below the normal size, while the genital organs were well developed. The condition of the vessels was identical with that described by Virchow in 1872, and supposed by him to be characteristic of chlorosis. The blood was tested with reference to its amount of hæmoglobin, which was found to correspond to 407,000 red corpuscles per cubic millimetre, but the corpuscles were not counted. It is by no means clear that the case was not one of pernicious anæmia, assuming, contrary to the writer's opinion, that it is possible to draw a line between fatal chlorosis and pernicious anæmia.

Potain²² reports the case of a young woman, aged 22, with marked chlorosis and general anasarca. A thorough examination having excluded disease of the heart, and the urine being free from albumen, he concludes that the œdema was due to the action of cold upon a chlorotic woman of rheumatic constitution, and formulates the opinion that the union of chlorosis with a rheumatic diathesis constitutes a marked predisposition to œdema. At the same time he refers to cases in which anasarca was due to a lesion of the kidneys not manifesting itself by albuminuria. The conjunction of œdema, not due to venous thrombosis, with chlorosis should always excite the suspicion of latent kidney disease.

A remarkable case of chlorosis, complicated with wide-spread thrombosis, is reported by Huels.⁴ The thrombus began in the left saphena parva, extended rapidly upward, involving the popliteal, femoral, common iliac, cava, and the large trunks of the right lower extremity. At the same time, in the left axillary or subclavian, an independent thrombosis occurred. The venous circulation of the lower extremities was now carried on by the veins of the integument, the lumbar and azygos veins; that of the upper extremity by means of numerous communications with the innominate vein. In a few days the circulation, by means of these collateral channels, was thoroughly re-established, but this had barely occurred when severe pain in the abdomen set in, followed by renewed swelling of the lower extremities and almost total suppression of the urine, which, hitherto normal, was now loaded with albumen. These symptoms pointed unmistakably to

an extension of the thrombus along the vena cava to a point above the junction of the renal veins. The only channel by which the circulation from the lower extremities could now be maintained was the azygos vein, through its communication with the vena cava superior. In consequence of the increased pressure in this vessel, marked signs of cerebral disturbance and disorders of vision and hearing now arose, and yet, notwithstanding these and other symptoms too numerous to mention, the patient finally recovered. As illustrating the wonderful power of the circulation to adapt itself to unfavorable circumstances, the case is one of the most remarkable on record.

Treatment.—The tendency of recent opinion with reference to chlorosis is that the therapeusis of this affection has been, so to speak, too direct. The blood being deficient in iron, it has been supposed that the administration of this metal was all that was needed to effect a cure. The affection is now regarded by the most competent hæmatologists as the expression of a general condition of cachexia, which must be overcome before a complete cure can be achieved or a relapse prevented. A treatment, therefore, to be successful must be hygienic as well as medicinal. This is insisted on by Peter,³ who urges the importance of daily sponging, surf-bathing, massage, and outdoor exercise, especially on horseback. He admits that ferruginous preparations are indispensable, and believes the best of them to be iron filings, which he prescribes in a powder with precipitated chalk, coffee, and rhubarb. In other cases, where there is a craving for vinegar and other acid articles, he has derived benefit from the use of hydrochloric acid. His plan seems to be, so far as drugs are concerned, to take a leaf from the book of the patient's idiosyncrasies.

Part of the benefit derived from outdoor exercise is probably due to the hæmatinic effect of the sun's rays. An analysis of 78 cases by A. J. Richardson² showed that their number "reached a maximum in January and a minimum in July, corresponding to the maximum and minimum of temperature and of actinic activity of sunlight."

There will always be wide differences of opinion concerning the relative therapeutic merits of the numerous preparations of iron. As just stated, Peter, like Trousseau, believes the best of them to be iron filings, and, probably, the weight of authority is in favor of the view that the efficacy of a martial medicament is

in direct ratio to its insolubility. An emphatic dissenter from this opinion is Thiébault,¹⁵² who considers the albuminate of iron the most assimilable of all ferruginous drugs, and prescribes it in solution with potash salts. He deduces this prescription from a chemical study of the red corpuscle, and, without giving any details, claims remarkable success from its employment.

From a careful study of 12 cases, Antiq¹⁰⁴¹ concludes that the best results in chlorosis will be achieved by enemata of defibrinated blood. In the event of failure of the ordinary methods of treatment this one might be well worthy of trial, otherwise the objections to its use are decided.

PERNICIOUS ANÆMIA.

The nature of this obscure disease is still widely discussed, the fundamental questions being whether it depends on defective hæmogenesis, excessive hæmolysis, or a combination of these two processes. In the reasonable expectation of solving them the blood, the viscera (especially the liver), and the urine have been repeatedly examined, but thus far without bringing to a common focus many divergent views.

Wm. R. Graves, of Dublin,²² examined the blood by Weigert's method in 2 cases of pernicious anæmia, and found that most of the red cells remained unstained, whereas, of 2 cases of leucocythæmia, in one all the red cells were faintly, and in the other very deeply, stained. He ascertained by experiment that red cells deprived of their hæmoglobin refuse to stain, and concludes that these bodies in pernicious anæmia are robbed of their coloring matter. Earl¹⁶, and Purser¹⁶, dissent from Graves' conclusions, the latter on the ground that the blood was altered by the methods employed in its examination, which consisted in first hardening the tissue in Müller's fluid and afterward staining by Weigert's process. He believes that Müller's fluid deprives the cells of their coloring matter. Earl appears to regard Weigert's method as a very uncertain one for examining blood in tissue sections, for he states that in some of his own preparations "he found the large blood-vessels filled with corpuscles that did not stain at all, and then he came on other blood-vessels containing corpuscles that were always staining." Purser also expresses his conviction that, while there is no doubt an extensive destruction of

red corpuscles in pernicious anæmia, this is a consequence of the formation of an imperfect blood. An exactly similar view has been maintained by me.^{9 Oct. 12} Evidence of excessive hæmolysis are undoubtedly found in pernicious anæmia, but are by no means limited to that affection. W. Russell,^{2 Jan. 12} examined 44 livers taken without selection from his hospital cases, and in 7 found as marked an iron reaction as is obtained from the livers of cases of pernicious anæmia. In none of these cases was there an ante-mortem examination of the blood, but from their nature—carcinomatous and nephritic—it is certain that its quality was seriously impaired. Russell concludes from his researches that the increased blood destruction in liver and spleen in cases of pernicious anæmia is due to the condition in which the blood reaches the liver; in other words, that the excessive hæmolysis, which undoubtedly characterizes this affection, is but a consequence of defective hæmogenesis. His observations also furnish additional evidence in favor of the view that pernicious anæmia is a process common to a number of affections and not an independent disease. F. Walker Mott,^{6 Mar. 10} reports a case of pernicious anæmia in which he observed an unusually dark color of the urine, which contained an amount of uric acid estimated, on several occasions, to be three times the normal amount. At the necropsy he was able to demonstrate that the liver contained a large amount of iron.

W. Hunter,^{15 Sept.} has published a series of observations on the urine in pernicious anæmia, which bring additional facts to the support of the opinion generally held that the affection is essentially one of excessive hæmolysis. In the case which he studied the urine was habitually dark-colored, resembling an "extremely dark sherry, presenting generally at the same time something of an olive tinge." This color was proved by chemical and spectroscopic examination to be due, not to bile-pigment or hæmoglobin, but to *pathological urobilin*, a substance known to be "derived from the disintegration of hæmoglobin."

If these interesting observations of Hunter should prove to be of general application to pernicious anæmia, the time will come when no case of that affection can be regarded as exhaustively studied unless an examination of the urine, both chemical and spectroscopic, has been made.

Critzman¹⁶⁴
Apr. 4, 25, May 16, June 6 reviews the subject of pernicious anæmia

in an interesting manner, but makes little or no reference to any but Continental writers, about the only exception being Addison, who, by the way, is spoken of as Eddison.

Lépine²¹¹, suggests that information of value in the various forms of anæmia may be derived from a study of the comparative destructibility of the red corpuscles. This may be done by allowing the blood to flow into an artificial serum, and then adding certain chemical substances that are known to exert a solvent action upon the corpuscles. In this manner he has been able to demonstrate that in the anæmia resulting from loss of blood, as well as in that due to malarial poisoning, the corpuscles are especially vulnerable. The communication is suggestive, but wanting in necessary details.

Lichtheim⁴ calls attention to the frequent occurrence of spinal degenerations, especially of the posterior columns in cases of pernicious anæmia. The symptoms of this condition are masked by others dependent upon the profound anæmia, so that attention is rarely directed to them. In none of the cases examined—their number is not stated—was the cord found in a normal condition. In one-half of them the only morbid change consisted of small, submiliary, sclerotic foci, shown by the microscope to have their origin in apoplectic extravasations. In the other half there was wide-spread degeneration of the posterior columns. The columns of Clarke and the posterior nerve-roots were never involved. The condition is undoubtedly secondary, precisely similar changes having been observed by Lichtheim in a case of splenic leukæmia.

Julius Bartels⁴ reports a case of pernicious anæmia complicated with icterus, which the autopsy proved, by the absence of any disease of liver or biliary passages, to be hæmatogenous. The duration of the disease in this case and in a similar one reported by him last year, and noticed in the ANNUAL, was comparatively short,—about eight months in each,—and Bartels holds that icterus in pernicious anæmia is generally prognostic of a rapidly fatal issue.

Byrom Bramwell⁷⁶⁶ gives a very full description of the microscopical characters of the blood in pernicious anæmia, and details, with care, the precautions which should attend its examination. Two admirable colored plates are given, showing the characters of the blood in pernicious anæmia and in leucocythæmia.

Treatment.—Broadbent,⁶ reports the case of a woman, aged 26, who was cured by arsenic. The principal symptoms, which were gastric, subsided under the use of the drug,—2½ minims (0.15 cubic centimetres) of liquor arsenicalis every three hours,—and steady improvement set in. In less than three months from the date of admission the patient left the hospital, and two months after that she was “feeling well; there was a good deal of color in the lips and cheeks, and the catamenia had returned.” The report is defective in that it contains but one account of a blood examination made at the time of admission, when the red corpuscles numbered only 700,000 per cubic millimetre.

H. Meyer,²¹⁴ reports a case with every symptom of pernicious anæmia, although without accurate reports of the state of the blood, in which a complete cure rapidly followed a single, thorough lavage of the stomach. The patient was a female aged 25, who showed symptoms of severe anæmia two weeks before labor, which occurred in a perfectly normal manner. She was first seen by Meyer two weeks after the birth of her child, at which time she was profoundly anæmic, feverish, with retinal hæmorrhages and all the other symptoms and signs of pernicious anæmia, those referable to the stomach being more pronounced than usual. The customary remedies having been prescribed without benefit, Meyer decided to adopt the method of lavage first employed in a similar case, and with the best possible results, by Sandoz. The beneficial results of this procedure were so striking that, if the symptoms of the case had not been so conclusive, he would have been inclined to question the correctness of his diagnosis.

Westphalen,²¹⁵ reports a case of anæmia of pernicious type—840,000 red corpuscles per cubic millimetre—which was cured by the hypodermatic injection of defibrinated blood, the patient being a male aged 36; and Suckling,² reports the case of a woman, 46 years of age, whose red corpuscles were about tripled in number after one month's treatment with arsenic. There can be no doubt that this drug retains its pre-eminence among the so-called remedies of this intractable disease.

LEUCOCYTHÆMIA.

The rarity of this disease, though confessedly great, has probably been underestimated. This remark is particularly appli-

cable to the affection, as it occurs in infancy and early childhood. There can be no doubt that the great majority of reported cases of leucocythæmia in childhood, many of them resulting in cure, were not genuine examples of this disease.

Von Jaksch,⁸ in his report of a typical case of leukæmia in a boy 14 months old, states that the circle of blood diseases is larger in children than in adults, and should be made to include an affection which he calls *anæmia infantum pseudoleucæmica*. In adults the co-existence of chronic enlargement of spleen, liver, and lymphatic glands, with persistent leucocytosis of high degree warrants the diagnosis of leucocythæmia. It is, says v. Jaksch, quite different with children, and especially so with reference to the leucocytosis, on which alone the diagnosis is so often based. Persistent leucocytosis of high degree (1 to 20, 1 to 12) may be present in various chronic anæmias, especially in that dependent upon rachitis, and even in acute diseases, such as pneumonia. The differential diagnosis between such conditions of leucocytosis and genuine leucocythæmia is comparatively easy. The greatest difficulty occurs in connection with the affection above mentioned, to which v. Jaksch has given a separate title. The lines of differential diagnosis between it and leucocythæmia are by no means clearly defined, but the prognosis of the two affections is so different that the slightest points of diversity may prove of practical value. In both there is enlargement of spleen and lymph-glands, together with leucocytosis. In leukæmia there is also enlargement of the liver, which proceeds *pari passu* with that of the spleen in such a manner that the normal proportion between these organs is maintained. In *anæmia infantum pseudoleucæmica* the liver may also increase in size, but its enlargement does not keep pace with that of the spleen. Again, in genuine leukæmia the edge of the liver is rounded, while in the spurious form it is sharp. These differences, it is true, are slight, but, with increasing opportunities of studying the two conditions, other and more marked ones may become apparent.

Von Jaksch believes genuine leukæmia to be exceedingly rare in children, and is able to refer to but 3 cases reported by Stilling, Hochsinger and Schiff, and Demme. His own case, which was most minutely studied, is therefore a valuable addition to the literature of leukæmia.

Brief reports of cases of leukæmia are made by McCall Anderson²¹³_{May} and Kinnicutt.⁵⁹_{Apr. 13} In Kinnicutt's case the blood contained a large number of eosinophile cells. Ebstein,⁵⁷_{July 14} reports a remarkably acute case of leukæmia. After four weeks of undefined prodromal symptoms, consisting chiefly of headache and loss of appetite, symptoms of purpura hæmorrhagica and severe epistaxis set in. An examination of the blood showed pronounced leucocythæmia. There was enlargement of spleen and lymph-glands, moderate fever, and rapid pulse and respiration. The patient died eight days after admission to hospital and eighteen days after the first signs of purpura, the whole course of the disease, including the prodromal stage, being about six weeks. The patient was a man aged 23.

Westphal⁴_{Oct. 7} believes leukæmia to be a specific, infectious disease, although all his attempts to transmit it to animals have proved abortive. The material for inoculation was obtained by puncturing the spleen of leukæmic patients,—an operation which produced a fatal hæmorrhage in one case. In the discussion of Westphal's paper, Stintzing, Curschmann, and Mosler expressed the opinion that injuries of the spleen and lymphatic glands might act as the exciting cause of leukæmia.

Treatment.—The marked success which followed the inhalation of oxygen in the case reported by Sticker (see ANNUAL for 1888) has induced others to employ this measure in the treatment of leukæmia. Da Costa and Hershey⁵_{Nov.} report 2 cases treated in this manner, 1 of which, a boy of 13, was cured; and the other, a man of 35, greatly improved, and, at the time of the report, apparently on the way to recovery. The improvement in each case dated from the commencement of the oxygen inhalations. Previous to their employment arsenic, quinine, iron, and other drugs had been employed with little or no benefit. On the other hand, Thacher⁵_{Sept.} reports a case of splenic leukæmia treated with arsenic, iron, and inhalations of oxygen. "No effect," says he "was produced on the leucocytosis by either the iron or the small doses of arsenic." Large doses of arsenic, however (30 drops of Fowler's solution thrice daily), were of decided benefit. Kahler,⁵⁷_{Aug. 11} in an interesting clinical lecture on a case of lymphatic leukæmia, mentions having employed oxygen inhalations without success. It is possible that the quality of the oxygen employed and its dose may

account for these discrepancies. The gas employed by Thacher was dilute, being one-third nitrogen, and of this mixture 28 quarts (26.5 litres) were inhaled daily; whereas, in the cases of Da Costa and Hershey, the oxygen was perfectly pure and given in much larger amount, the maximum dose being 100 litres (105 quarts) per diem. In this connection it is worthy of notice that Quinke observed a case of leukæmia in which all the symptoms subsided when the patient was attacked with general miliary tuberculosis. Stintzing⁴_{Oct. 7} has made a similar observation.

At the last meeting of the Association of American Physicians the relations between the various forms of anæmia were discussed at considerable length by F. Forchheimer⁹_{Oct. 12} and myself.⁹_{Oct. 12}

THE SPLEEN.

Anatomy and Physiology.—That the spleen possesses the property of contractility is acknowledged by every one and readily demonstrated by the application of electricity to the organ recently removed from an animal. It has been taken for granted that the



FUNDAMENTAL TISSUE-CELLS
OF SPLENIC PULP.
(Virchow's Archiv.)

contractile elements of the spleen are unstriped muscular fibres, but Malinin²⁰_{Feb.} has searched for them in vain. According to this observer, the fundamental tissue of the splenic pulp is composed of spindle-shaped cells, with a round nucleus projecting from their side in a hernia-like protrusion. These cells possess an extraordinary power of contractility, and may vary in length in accordance

with the degree of their irritation, from 30 to 100 μ . These nuclei, which are readily detached, possess the power of amœboid movement, which may continue for a considerable time after death. The nuclei are genuine phagocytes, and, under normal circumstances, contain either the fragments of red corpuscles or one or two of these bodies entire, while, in pathological conditions, notably in malarial and typhoid fevers, they may contain fifteen or more red cells. It is this stuffing of these nuclei with red corpuscles which chiefly causes the enlargement of the spleen in these febrile states. According to Malinin, whose interesting paper deserves the most careful study, the spleen is an organ

which, by means of the cells described and figured, serves to rid the organism of effete red corpuscles. Certainly this function would seem to be a most important one, but there can be no doubt that it can either be dispensed with or performed by other organs. This follows from the fact that the spleen can be removed with impunity. An interesting case of successful splenectomy is reported by Maccall.²_{July 12} The patient was a young married woman aged 21 years; the cause of the splenic enlargement was malaria; the operator was Sir Spencer Wells; and the blood was examined a year after the operation by Dreschfeld, and found normal as to the number of the red and white corpuscles, the percentage of hæmoglobin being between 75 and 80. This diminished percentage of hæmoglobin might have had no connection with the absence of the spleen, but it is certainly of interest when taken in connection with the experiments of Krugner,¹_{Sept. 14} who found in the splenic vein of cats a greater proportion of hæmoglobin and solid extracts than in the blood of the carotid artery of the same animals.

Lapicque,³_{July 24} who has been studying the distribution of iron in the organism, finds that in the spleen of dogs the quantity of this metal is much greater in the adult than in the newborn animal.

Bouchard¹⁵²_{Mar. 25} contributes an interesting article on splenic murmurs, and differs from Griesinger and others, who attribute them to compression of the large abdominal vessels by the splenic tumor. A purely splenic murmur is heard when the patient lies on the left side so as to remove any possible pressure from the abdominal vessels. Care must also be taken not to confound a transmitted cardiac murmur with one having its origin in the spleen. The cardiac murmur most likely to be transmitted to the spleen is that due to aortic insufficiency, which condition also sometimes causes the spleen to pulsate.

Rupture.—Dock¹¹²_{May} reports 2 cases of rupture of malarial spleen from traumatism, both recurring in males, and both fatal; and Barrallier³⁰⁰_{Sept. 79},²_{Feb. 16} 2 cases of spontaneous splenic rupture in sailors about 20 years of age, who died very suddenly during a first and mild attack of ague.

Tumors.—A case of degenerated mucous cyst of the spleen is reported by J. F. Haswell.¹⁸⁷_{Jan.} The patient, aged 57, died of pyloric cancer. During life a fullness of the left hypochondrium was

noticed, and aspiration performed. At the autopsy the principal cyst—there were two—was 12 inches long, and its breadth 5 inches. A second, smaller cyst was imbedded in the splenic tissue. Cysts of the spleen are extremely rare. In the case in question a careful examination was made for echinococci or their hooklets, but none were found; neither was there any trace of dermoid structure.

R. Douglas²⁷_{Apr.} reports a case of enlarged spleen, which, during life, was mistaken for uterine myoma. The patient, a "bright mulatto," died, after suffering with great prostration, nausea and vomiting, and intense abdominal pain. The mistake in diagnosis was due to the fact that the bulk of the tumor lay to the right of the median line. At the autopsy the pedicle of the greatly-enlarged spleen was found twisted so as to obstruct the return of venous blood; as a consequence, the splenic vein was almost as large as the small intestine.

Bianchi,⁴¹_{Feb. 21} formulates a number of rules by which a syphilitic enlargement may be distinguished from other tumors of the spleen. A principal mark of distinction, according to this observer, is that the syphilitic spleen is pear-shaped, with the smaller end pointing upward and backward and the larger end downward toward the left iliac fossa. Cases of enlarged spleen are reported by Dyson,⁴_{Nov.} and Owen.²_{Jan. 20}

Gustav Klein,³⁴_{Oct. 25} reports a case of floating spleen, the displaced organ being found at the autopsy in the true pelvis, where it was supported by a ring-pessary, the uterus being forced backward into a position of retroflexion. Fibroid thickening of the splenic capsule is quite rarely observed. A case of it is published by Alex. G. R. Foulerton.²_{Oct. 15} Médail²¹²_{Nov.} calls attention to the fact, already pointed out by Landouzy, that hypertrophy of the spleen is quite common in the tuberculosis of children, and may, therefore, be of decided diagnostic significance in obscure cases of the latter disease.

Therapeutics.—Murri and Boari,¹¹³_{Jan. 13} believing the benefit derived from parenchymatous injections into the spleen to be independent of the nature of the fluid employed, treated a case of splenic tumor by daily injecting into the enlarged organ one Pravaz syringe-ful of distilled water. The result was a considerable reduction of the size of the spleen. Nigris,⁹_{July.} has repeated this experiment with similar results. The procedure excites inflammation and subsequent contraction, and this seems to be accom-

plished as effectively with pure water as with solutions of arsenic, quinine, strychnine, etc., and doubtless with greater safety. Feletti⁴⁷⁴_{Nov. 4, '98}; ⁹_{Mar. 20} has treated successfully 2 cases of chronic malarial enlargement of the spleen with acupuncture. The needles are disinfected and plunged into the spleen, the result being the formation of new connective tissue. In a case of greatly-enlarged spleen, Wyman,⁶¹_{Jan. 1, '00} ligatured two branches of the splenic artery as they entered the organ. The patient died forty-eight hours after the operation. Wyman was led to perform this operation "as a result of a series of surgical studies of the consequence of ligation of the splenic artery and its branches in dogs." If any additional proof be needed that splenectomy, under appropriate circumstances, is a legitimate operation, it is furnished by the case reported by Maccall, to which reference has already been made.

THROMBOSIS AND EMBOLISM.

It is difficult to isolate the subjects of thrombosis and embolism, because they are generally discussed under the head of the affections to which they are secondary. For example, under the head of chlorosis, I have already referred to Vergely's article on thrombosis occurring in the course of that affection. The opinion is well established that chlorosis predisposes to thrombosis, either by the fatty degeneration of the intima of the vessels to which it, in common with all profound anæmias, may give rise, or by some alteration of the blood favoring coagulation. Julius Weiss¹¹³_{May 5} favors the latter hypothesis. Malnutrition, or even fatty degeneration, of the intima is not alone sufficient to cause thrombosis. This has been established by the experiments of Eberth and Schimmelbusch, who proved experimentally that the intima might be necrotic or even absent altogether without coagulation resulting. As long as the inner vascular surface is *smooth*, thrombosis will not take place. In those affections, therefore, in which thrombosis is most common,—namely, in carcinoma, phthisis, typhoid fever, and chlorosis,—it must be assumed that the composition of the blood is altered in such a manner as to favor its coagulation.

Under the head of "Chlorosis," reference has been made to a remarkable case of venous thrombosis reported by Huels.⁴_{Nov. 11} Faison⁴⁸_{July} reports a "case of spontaneous thrombosis of the pulmonary artery following labor, with recovery." On the eighth day after

confinement the patient was seized with sudden, intense dyspnoea; the countenance was somewhat cyanotic, and the pulse and respiration greatly accelerated. The heart was irregular and tumultuous in its action, and over the pulmonary valves a decided grating or rasping sound could be heard. Previous examinations of the heart had given negative results. Recovery was tedious. The reporter regards the case as one of thrombosis rather than embolism, because he was unable to detect the presence of thrombosis elsewhere; but it seems more reasonable to believe that a fragment of clot might have been detached from some deep-seated vein in or near the uterus, and thence conveyed to the pulmonary artery, than to suppose that a thrombus could form spontaneously in the pulmonary artery.

A case of arterial thrombosis is reported by Mallet.⁷_{Feb. 11.} The patient was a phthisical woman, and the site of the thrombosis was the left subclavian, axillary, and brachial arteries. The symptoms, which only appeared a few days before death, were severe pain in the left arm, extinction of the left radial pulse, coldness and purplish discoloration of the hand and arm. The origin of the coagulum was at the point of origin of the subclavian artery, where an enlarged lymphatic gland pressed upon and slightly diminished the calibre of the vessel. A bacteriological examination of the coagulum, made by Vaquez, showed the presence of micro-organisms mostly in chains, some diplococci, and some arranged in fours, resembling the micrococcus tetragenus. The presumption is that the thrombus was of infectious origin.

Oscar Silbermann²⁰_{Aug. 1} has performed a number of experiments to determine the question whether substances such as sodium chlorate, anilin, pyrogallie acid, phosphorus, arsenic, etc., which are known to be destructive to the red corpuscles, do not also give rise to thrombosis. The response was emphatically affirmative, and it is in the highest degree probable that thrombosis is the cause of some of the symptoms of poisoning from the bites of scorpions and serpents, and of the affections characterized by hæmoglobinuria and hæmorrhagic infarcts of lungs, kidneys, and other organs. In none of Silbermann's experiments could a lesion of the intima be advanced as a cause of the thrombus, and therefore they tend to confirm the growing opinion that a dyscrasia of the blood is the chief cause of intra-vascular coagulation. G. Sée¹⁵²_{Mar. 16} gives an in-

interesting *résumé* of existing theories of the genesis of thrombi, and draws a distinction between conglutination and coagulation. The white thrombi, so commonly observed, are composed of a conglutination of hæmatoblasts or blood-plaques; the red thrombi of a coagulation of the blood *en masse*, such as occurs outside the body. The former takes place in circulating, the latter in stagnant, blood. For the production of a thrombus during life two factors are indispensable,—a lesion of the vessel-wall and a retardation of the circulation. Sée attributes thrombi to mechanical causes alone, and does not even consider the possible causative influence of a blood dyscrasia.

It is probable that the formation of thrombi is favored by the gouty diathesis. An interesting case in point is reported by J. Gordon Black, of Harrogate. ²⁶_{June} The patient, a man aged 70 years, was suddenly seized with violent pain in the knee, followed by all the signs of inflammation of the joint. Two days later, on imprudently leaving his bed, he fell to the floor unconscious, with labored, gasping breathing and fluttering pulse. There was dullness over the upper part of the left lung, and in the same area the breath-sounds were scarcely audible. Improvement gradually set in, the dullness diminished, and the breath-sounds returned, and recovery was finally complete.

TRANSFUSION.

Transfusion was the subject selected by William Hunter ²_{July 20; Aug. 2, 10} for a course of three lectures before the Royal College of Surgeons. His conclusions, which are based upon experiment, are that, for practical purposes, “all the advantages to be gained by transfusion may be equally well and more readily obtained by infusion of a neutral saline, such as $\frac{3}{4}$ -per-cent. solution of common salt (about 1 drachm—4 grammes—to the pint—500 cubic centimetres). Under no circumstances is transfusion of milk or of other mixtures, possessing what are supposed to be nutritive properties, even indicated. They possess no value not possessed by an equal bulk of saline solution.” While it is generally acknowledged that the transfusion of entire blood is a dangerous operation, many cling to the belief that the risk is largely done away with by the employment of defibrinated blood. Hunter unmasks this fallacy. “Any advantages,” he says, “that trans-

fusion of red corpuscles may have over simple saline injections are counterbalanced by the dangers attending the simultaneous injection of the white. In the case of defibrinated blood, the latter so preponderate that transfusion of defibrinated blood is an operation not only dangerous in itself, but one whose practical value by no means serves to compensate the additional risks run in carrying it out."

For the operation of transfusing a saline solution, the only instruments needed are a glass cannula, 3 feet of small, clean tubing, and a funnel, the fluid being allowed to flow into the vein by gravity. As has been shown by Hare,⁸⁰ the danger of the entry of air into the venous circulation has been greatly exaggerated.

An interesting case of traumatic anæmia treated successfully by intra-venous saline transfusion is reported by E. D. Martin.¹² The patient was admitted to hospital with a large abscess in the left pectoral region which had followed a stab-wound. The abscess was opened and found to contain blood-clots. Repeated hæmorrhages ensued until the surgeon on duty, Miles, opened up the cavity and ligatured the axillary artery above and below a wound which half divided it. By this time the patient's pulse was scarcely perceptible and beat 170 per minute. A transfusion of 1 pint ($\frac{1}{2}$ litre) of salt solution, 60 grains to the pint (8 grammes to the litre), produced immediate improvement, followed by rapid recovery.

W. H. Brown,⁶ reports the case of a woman apparently dying from long-continued hæmorrhage from a uterine polypus. The patient being too weak for any operative treatment, 25 ounces (780 cubic centimetres) of the normal saline solution were injected into the median cephalic vein. Improvement rapidly ensued, food was retained, and three days later the polypus was removed. Brown states that in 5 similar cases he had used human blood with unsatisfactory results—he does not specify their nature—and intimates his decided preference for saline transfusion.

P. J. Keegan²¹⁶ reports a remarkable case of intestinal hæmorrhage successfully treated by the transfusion of defibrinated blood. The patient, at the time of the operation, was exsanguinated to the highest degree and the tissues so bloodless that an extensive dissection for the collapsed vein caused a flow of "*about two drops of blood.*" The cause of the hæmorrhage was probably an ulcer of

the duodenum involving the orifice of the common bile-duct, as the gall-bladder was greatly distended and the patient at one time deeply jaundiced. The amount of blood transfused was 8 ounces (235 cubic centimetres). Three cases of transfusion are reported by A. W. Mayo Robson.^{26 Aug.} The patients were females and the hæmorrhage in all three was uterine. The fluid employed was defibrinated blood, mixed with a solution of sodium chloride. The first 2 cases, which were puerperal, recovered, but in the third, which was cancer of the uterus, the benefit was, as a matter of course, only temporary. The apparatus employed by Robson in these operations was an Aveling's transfuser.

The following successful case of transfusion, reported by A. R. Anderson,^{2 Feb. 18} shows that no one need hesitate to perform this operation for want of suitable apparatus. The patient was a lad, aged 15, who was admitted to the Nottingham General Hospital with what was supposed to be a large abscess involving the lower third of the thigh. It was pointing in the inner side of the limb, and fluctuation was well marked. An incision was therefore made, which gave exit to turbid serum and blood-clot. A counter-opening was made on the outer side and a drainage-tube inserted. All went well until eight days later, when profuse hæmorrhage suddenly occurred; the boy became pulseless, and was evidently at the point of death. "Transfusion was the only method of treatment which held out any prospect of success, and, as there was no proper apparatus at hand for the purpose, I operated in this way: A small cannula from a pocket-trocar was attached to an India-rubber tube, and to the other end of the tube a glass funnel. The solution used was 2 grains of chloride of sodium to the ounce (13 grammes—30 cubic centimetres) of warm water (temperature 100° F.—37.8° C.), and 18 ounces of this was allowed to flow into the median basilic vein, with marvelous and immediate effect." The next day the wound was opened by Wright, and the popliteal artery found partially ruptured. After the operation, the patient again became collapsed and pulseless, and the transfusion was repeated, 12 ounces (355 cubic centimetres) of the same solution being injected. After this, recovery was rapid and complete. It may be added that the rupture of the vessel had been caused by a crush of the right knee between two colliery trams.

There is considerable evidence to show that the subcutaneous

transfusion of a saline solution is, in most cases, quite as efficacious as the intra-venous. Münchmeyer⁸⁵ reports 8 cases of severe anæmia, mostly the result of post-partum hæmorrhage, successfully treated by the subcutaneous injection of a saline solution. In 10 other cases of extreme anæmia after laparotomy and other severe operations, the injection was without result, this being due, in Münchmeyer's opinion, to paralysis of the heart from degeneration (brown atrophy) of its substance. The infra-clavicular region is considered the best site for the operation. The apparatus employed consists of a funnel, an India-rubber tube, and several needles. The needles are sterilized by heat, and the funnel and tubing by pouring through them a 5-per-cent. solution of carbolic acid. The first part of the transfusion fluid is allowed to escape in order to wash out the carbolic acid. The needle, which is much larger than an ordinary hypodermic needle, is then pushed beneath the integument, the funnel raised, and the fluid allowed to flow into the subcutaneous tissue by its own gravity. The absorption of the liquid is facilitated by massage. The solution employed was 0.6 per cent. of common salt, and the amount transfused varied from $\frac{1}{2}$ to 1 litre (17 to 35 ounces). I have often performed transfusion in this manner in my wards at the Philadelphia Hospital, and found it most serviceable. The point of puncture selected by me was invariably the anterior surface of the thigh, a little above the knee-joint. Instead of the funnel and tube, Pregaldino²⁷⁰ employs a syringe to which is adapted a hollow needle. In this way much time may be saved, as the flow of the fluid by gravity is sometimes very slow; but, unless the syringe is very large, numerous punctures will be necessary.

It is undeniable that subcutaneous transfusion is a most valuable therapeutic resource in the collapse which follows a large loss of blood; but the question may well be asked whether it be applicable to cases of internal hæmorrhage, in which the blood may be escaping from the vessels at the time of the operation. The first duty of the physician, in cases of hæmorrhage, is to arrest the bleeding; but if this be impracticable, as in gastric or internal hæmorrhage, will anything be gained by the employment of transfusion? or, on the other hand, will it not tend to favor the loss of blood by the increased cardiac action which it undoubtedly excites? Sufficient facts have not yet accumulated to enable one

to give positive answers to these questions, but if the examples of Chazan³¹⁷_{Aug. 17} and Wiercinsky³¹⁷_{Oct. 12} are followed it will not be long before the indications for transfusion in such cases will be as precise as in the external forms of hæmorrhage. Chazan employed subcutaneous transfusion (1-per-cent. salt solution) in a case of ruptured tubal pregnancy which terminated in recovery. At the time of the transfusion the patient was in such a state of collapse that laparotomy was out of the question. In a precisely similar case Wiercinsky practiced intra-venous saline transfusion without success, the patient dying two hours after the operation. He concludes that intra-venous transfusion is not to be performed in such cases, and that if the fluid is injected under the skin it should be done very gradually. This is in accordance with the dictates of physiology. After a severe hæmorrhage there is a fall of the blood-pressure and a contraction of the vessels, both of which favor thrombosis. If now we throw into the veins a quantity of salt solution, we not only raise the blood-pressure, but we excite the heart and dilute the blood; in other words, we oppose nature in her efforts to close the ruptured vessels. Questions such as these, however, cannot be settled by *à priori* considerations. With the facts at our command, it may be positively stated that in cases of internal hæmorrhage the gradual subcutaneous transfusion of a saline solution is an appropriate proceeding, and may be the means of saving life.

The intra-venous transfusion of blood is practically abandoned, and rightly so; nevertheless, statistics can show good results from this almost obsolete proceeding. In an article on the future of transfusion, Jacqueline²⁴_{Mar. 27} quotes the figures given by Oré, of Bordeaux, in his work on transfusion. They are brought down to the year 1876, and include 535 cases, of which 381 were transfusions with human blood and the remainder with alien blood. There were 247 complete cures, 35 ameliorations, and 49 cases in which no effect in either direction was appreciable. In 1 case operated on by Biedlung in 1839 the patient was 83 years of age, and exhausted by repeated hæmoptysis. Five ounces of goats' blood were transfused. Some oppression ensued, followed by slight phlebitis, but at the end of three months the patient's recovery was complete—at the present day one is tempted to say—in spite of the treatment.

HÆMOPHILIA.

Hæmophilia does not always manifest itself by external hæmorrhage. This fact is well illustrated by a case reported by Frederick S. Eve. ⁶_{Nov. 16} The patient was a boy, aged 5, who had at various times suffered from sudden swelling and tenderness of the joints,—hæmarthrosis,—some of the attacks following slight injuries, others apparently spontaneous. On one occasion, when the hip-joint was affected, the boy was admitted to a hospital, treated as a case of hip disease, and discharged wearing a splint. Eve recognized the nature of the case, and, tracing the family, found abundant proof that his patient belonged to a family of bleeders. The arthritic complications of hæmophilia are, as implied by the term hæmarthrosis, generally the result of hæmorrhage into the joint cavities, but there is no antagonism between hæmophilia and articular rheumatism. Barling ⁶_{May 1} reports a case of hæmophilia in which an aortic murmur had resulted from a previous attack of rheumatic endocarditis.

Two cases are reported by Hermann Bock. ⁴¹_{July 11} In the first, a boy 3 weeks old, spontaneous bleeding occurred in both lower extremities, and, in spite of the most energetic treatment, including the actual cautery, proceeded to a fatal termination. In this interesting case vesicles formed in the integument, became filled with blood, ruptured, and gave rise to a hæmorrhage which gradually drained away the life of the infant. In Bock's second case, a male twin aged $2\frac{1}{2}$ years, the hæmorrhagic tendency first appeared during an attack of varicella, which immediately followed one of scarlatina. The varicellous vesicles became hæmorrhagic, and extensive extravasations took place in various parts of the body, but most marked in the scrotum, a portion of which sloughed away. Recovery finally took place. A case reported by Louis Vintras ²²_{Oct. 30} illustrates the danger of surgical interference in cases of hæmophilia. The patient was admitted to hospital with his right leg swollen, œdematous, and painful. The case was supposed to be one of cellulitis and the œdematous tissues were freely incised. Uncontrollable hæmorrhagic oozing set in and soon led to a fatal result. A clue to the nature of the case might have been obtained from the patient's statement at the time of his admission that he had been subject to hæmorrhages, even from trivial causes, and that some years ago he had bled for a week from a small cut over

the eyebrow. James Young⁶_{Nov. 5} reports a case of hæmophilia in a male child, 13 months old, the site of the hæmorrhage, which proved amenable to treatment, being the gum. M. Cohn⁸¹⁹_{Oct. 11} believes the essence of hæmophilia to lie in a heightened activity of the blood-making organs, and regards the hæmorrhages into the joints and elsewhere as discharges, or eliminations, of superfluous blood.

G. Somma, corresponding editor, calls attention to a case of hæmophilia reported by Gregorio Cosella.⁴⁷⁴_{July} The seat of hæmorrhage was the umbilicus and the subcutaneous tissues. The child was syphilitic, and Cosella believes that syphilis may manifest itself in a hæmorrhagic diathesis. One of the cases of Bock, above referred to, was syphilitic.

SCURVY.

Scarcely a single case of scurvy was reported during the past year. This may be due to the fact that the disease, in its milder sporadic forms, is often overlooked, or confounded with allied affections, such as purpura, hæmophilia, and erythema nodosum. Notwithstanding this dearth of reported cases, the literature of scorbutus has been enriched during 1889 by a most notable contribution by William Koch.¹⁰⁷⁶_{Nov. 12} This excellent work will doubtless at once take rank as a standard on the important subject of which it treats.

Julian Evans,²⁵_{Nov. 22} records the following case: A child, aged 5 years, was admitted into hospital in September, 1885, suffering from general weakness and a spongy condition of the gums, but was discharged in about two weeks as cured. In February, 1886, however, he was re-admitted, and his mother stated that he had been ailing for weeks, complaining of pains in the legs and crying out if moved or dressed. The gums had been swollen and bleeding for some time, and for some weeks he had occasionally passed blood; the bowels had been constipated and the motions offensive. On admission the child was extremely weak and emaciated. Over the chest and temples were scattered a few purpuric spots. The gums, all around, both inside and outside the teeth, were livid, spongy, and very much swollen. The liver, spleen, and lungs were normal, and the urine was acid, specific gravity 1020; no albumen. The temperature varied from 99° F. (37.22° C.) in the morning to 102° F. (38.88° C.) or 103° F. (39.46° C.) in the afternoon. At first it was hard to make the child eat anything except

a little bread and milk, but soon he began to take the ordinary hospital diet, and was given lemon-juice, cress, and a mixture containing perchloride of iron. He then made rapid improvement, and by the end of March he was discharged quite well.

DISEASES OF THE UTERUS, PERITONEUM, AND PELVIC CONNECTIVE TISSUE; DISORDERS OF MENSTRUATION.

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AND

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UTERINE DISPLACEMENTS.

General Considerations.—The pathological relations of uterine displacements have been well discussed by Ernest Herman,² who makes the apparently paradoxical statement that uterine displacements are not diseases of the uterus, though they may be classified for convenience as uterine diseases, just as cerebral hæmorrhage is classified among nervous diseases. As cerebral hæmorrhage is a disease of vessels, not of nerve-tissue, so uterine displacement is not a disease of the uterus, but of the muscular and fibrous structures that support it, these being the tissues of the pelvic floor as a whole. In the natural action of the muscles, they do not contract singly and independently, but each movement is effected by the combined action of a group. So in the pelvic floor we cannot isolate the part taken by each muscular bundle and sheet of fascia. The pelvic floor has to continually sustain the intra-abdominal pressure, and, if not strong enough to support this, it gives way at its weakest point, the slit, at the top of which lies the uterus, which then becomes displaced. If we accept this statement as correct, the causes of uterine displacement are the causes which make the pelvic floor weak, and these are primarily the same that would produce a similar condition of the general muscular and nervous system. Besides those directly traceable to the weakness and anæmia following parturition, they are partly inherited, partly the result of training,—a training which, instead of making the child into a good animal, has been, perhaps not intentionally, directed toward developing the mind and hindering the

growth of the animal;—a training which develops complexity of nervous structure instead of nervous energy. It is the result of a childhood spent in learning a great deal and doing very little. The prophylaxis of these ailments must begin in childhood. Physicians should bear in mind that the influence of the surroundings of town life is toward the development of the intellect and the emotions, rather than of the bones, muscles, the digestive and the blood-making organs. This is especially the case among the middle classes; in the higher classes the attention to physical development in girls is helped by the examples of the great schools and universities. Among the lower classes the necessity for earning money compels the girl to healthy labor. It is in the middle classes that the influence of the family doctor may be most beneficial in impressing upon parents the advantage of healthy muscular labor, of outdoor play, of plenty of food and plenty of sleep, of warm clothing, of activity of body. With an active body will often go an active mind, but the active mind—the quick perception and attentive memory—should be allowed to exercise itself on things, not on words,—in doing, rather than in thinking or in reading. People must recognize that the end of a good education is not only to know, but to be able to do. A training which makes women tall and strong and muscular, with good appetites and the power of sleeping well, is best for their minds as well as for their bodies.

The questions relating to the influence of dress on the production of pelvic disease are becoming more widely recognized and appreciated. Kellogg,⁶¹ from a series of elaborate experiments and observations, seems to prove that in the normal female, untrammelled by corsets or constricting bands about the waist, the type of respiration is the counterpart of that in the male. If this be admitted, it is evident that respiration in the female has an important influence on the pelvic organs. Kellogg has found that constriction of the waist has a very marked influence upon intra-pelvic pressure. The average pressure exerted at the waist by a corset or tight bands is, in ordinary respiration, about $\frac{1}{8}$ inch (7.5 millimetres) of mercury. The movements of the uterus up and down are, in ordinary breathing, from $\frac{1}{8}$ to $\frac{3}{8}$ inch (2.5 to 7.5 millimetres). By the application of the corset or other constricting means the uterus is lowered in the pelvis from $\frac{3}{8}$ to

$\frac{5}{16}$ inch (5 to 12.5 millimetres). In a well-written paper on hygiene *versus* surgery in gynæcology, Julia W. Carpenter ²⁷ lays great stress on the injurious effects of pressure and weight of clothing on the hips. At the beginning of the Civil War there were companies of Zouaves that wore part of the accoutrements attached to a belt about the waist. So quickly was this disastrous, and so numerous were the men disabled with hernia, that they were obliged to discard the belt and suspend the weight from straps over the shoulders, when there was no further trouble. It is just as sensible to devise operations for hernia, instead of preventing it, as it is to work in gynæcology without removing this same weight. As long as there are weights above to press everything downward, so long will there be a necessity for devising operations to shorten ligaments, suture displaced organs to the abdominal walls, or remove parts otherwise healthy for pain only. Instead of operating on organs pressed upon, remove the pressure first; then, if recourse to an operation is still necessary, there is some foundation for permanent success. To do this, it is not necessary to change the external appearance of the dress at all. When physicians see the necessity, and impress on each patient the fact, that, instead of many pounds, not an ounce should rest on this part of the body, there will be no difficulty in the solution of the problem. Women will devise their own ways and means. It will not do simply to suspend the present weight from the shoulder. It is not in a small bulk, as with the Zouave company, so it can be lifted easily, but is voluminous and clinging, pressing in spite of suspension. So much weight must not be there to suspend. Teach every patient that all organs are pressed out of place; that the circulation is interfered with and a venous stasis results, and that a continued congestion can be the starting-point for disease. Lapthorn Smith, ¹⁸⁰ in discussing this same subject, does not think that women are alone to blame for wearing tight corsets; they only try to meet a demand. If men admired women of natural shape more than thin-waisted girls, the supply of the latter would soon cease to come on the market; so, we should educate our men to understand the probable sickness and costliness of corset-laced wives. The method of dressing known as the Jenness-Miller system seems to us to overcome the evils of the present style effectively, and without making any marked change in the outward appearance of the costume.

The dress is arranged so as to afford perfect protection to the lower limbs, with freedom of movement to every part of the body. It avoids any injurious constriction or pressure, while at the same time there is much less weight to be carried than with the ordinary system of clothing.

Anteflexion.—A. W. Abbott,¹⁰⁵ proposes a new operation for the relief of severe anteflexion of the cervix by shortening the longer posterior arc, and thus straightening the whole organ. The patient is placed in Sims's position, the uterus steadied with tenaculum, and the cervix slit with scissors laterally nearly as high as the sharpest point of the curve. The posterior lip is amputated sufficiently, so that when the divided surfaces are placed together the canal becomes nearly straight. Sutures are then passed from the anterior lip to the new posterior lip, so as to draw the raw surfaces into coaptation. The sutures should be passed in the same manner as for laceration of the cervix, except that they should be so placed that the mucous surface about the external os of the long anterior flap will be drawn back to a level with the posterior flap. In order to do this, the sutures must be placed farther apart in the anterior than in the posterior lip. He reports several successful cases where the symptoms were completely relieved by this means.

Retrodisplacements.—Besides what we have already noted, Eccles,²⁸ calls attention to the great frequency of retrodisplacements caused by too early getting up after abortion or labor, while the supports are still weak and the uterus large and heavy. Too tight bandaging and continuous dorsal decubitus during the puerperal period are also pointed out as potent and frequent causes.

Treatment.—Backward displacements may be somewhat roughly classified as those which are not and those which are adherent.

In non-adherent, uncomplicated cases, replacement is the first step in the necessary treatment, and for this end Richard Hogren,⁹⁷⁸ as stated by Eklund, of Sweden, corresponding editor, would not have us forget the great advantage of the knee-chest position. A simple case having been replaced, a well-fitting, well-chosen pessary is undoubtedly—the contra-indications being always borne in mind—a most useful help in further treatment. While most authorities favor the intelligent use of these instruments, Ricketts,²⁷ and Nowlin⁸⁶ speak strongly against them, claiming, from a study

of certain instances of their misuse, that their employment is not justifiable. A review of their arguments, however, does not seem to sustain their conclusions. Skutsch⁷⁸⁸¹_{Dec. 10, '90; Sept. 7} admits that an instrument has not yet been made which is adapted to the successful treatment of all cases of retroflexion; and yet the reason why pessaries fail in the practice of many is that the instrument is not properly fitted for each particular case, or that it is overlooked that there are resisting peritoneal adhesions and scars in the parametrium. In such cases good results can be obtained by gradual stretching and methodical massage of the adhesions and scars. Brandt's method will accomplish the gradual stretching of cicatricial bands.

While laparotomy undoubtedly allows the most brilliant results in the separation of posterior adhesions, it should not be forgotten that in many cases satisfactory results may be obtained without any cutting by the employment of Schultze's method (see ANNUAL for 1889), as in 20 successful cases recorded by Strong.⁹⁰_{July 11} Gottschalk³¹⁷_{Jan. 19} also speaks favorably of this method, which he has employed successfully, though some cases required repeated sittings,—a point the necessity for which he especially insists upon. (For massage see Prolapsus.)

Alexander's Operation.—This procedure seems to be growing in favor, papers advocating it and reporting successful cases being published by Abbott,¹⁰⁵_{Feb. 1} Alloway,²⁸²_{Oct., Nov.} Baker,¹²¹_{July} Berruti,⁵⁷_{Mar. 10} Debierre and Dutilleul-Peltier,¹⁸¹_{Mar.} Tod Gilliam,⁷⁸⁰_{July 6} Potherat,⁵⁵_{Jan. 9 et seq.} Strong,⁹⁰_{Oct. 17} Schwartz,³_{Mar. 27} Ségond,¹⁰⁰_{Mar. 21} Trélat,³⁵_{Apr. 4} Zajaitsky,⁵³⁰_{No. 1; Aug. 28} and Roux.¹⁵⁴_{Oct. 15} Richelot,¹⁷_{Apr. 4} is a lukewarm advocate, and Gairal¹⁵⁴_{Aug. 15} decides against the procedure because he has not had favorable results, because other and accessory operations, as repair of the cervix and perinæum, will be required to effect a cure, and because it is not suited to cases with adhesions. Polk,²⁷_{Oct.} who has recently reported 52 cases, considers that in extreme cases of retroflexion, with prolapsed and tender ovaries, benefit is usually only temporary. The benefit of the operation is questionable in ovarian prolapse, because there is usually accompanying disease of the organ itself or of its tube. The operation gives the most brilliant results in retroversion. In cases of prolapsus it has a distinct and useful position as an adjunct to measures for restoring the pelvic floor, and should always be employed. When Alexander's operation is

contra-indicated or inefficient, other methods are to be employed. These fall into two distinct categories, one utilizing the natural supports, the other creating new supports. Each has its own sphere, and experience must teach us which is best in any particular case.

Vaginal Hysterorrhaphy.—Candelia,⁷⁸⁸ Jan. 10, suggests suturing the fundus of the uterus to the abdominal wall, without laparotomy, by passing a needle and sutures from the uterine canal through the fundus and through the abdominal wall, one end of the silk being secured on the surface of the skin, the other at the vulva. The abdominal wall being thus brought into contact with the fundus, the vaginal ends of the sutures are secured by a small plate of suitable metal, after which the vagina is irrigated and lightly tamponed with antiseptic gauze; sutures to be removed on the eighth to the tenth day. An operation similar to this was suggested many years ago by Marion Sims, and later by others, but has not been considered practical, and we believe has not been performed on a living patient.

Ventral Fixation, Hysterorrhaphy, or Hysteropexy.—The tendency is to draw the lines of indication for this operation more strictly, and to limit its performance to those cases where it can be done in connection with laparotomy for some other purpose, as removal of the appendages, or where there are grave symptoms due to the displacement which cannot be remedied by other less severe measures. Successful cases for retrodisplacement with adhesions are noted by W. H. Brown,⁶ Frank,²⁸ Terrier,⁹¹ Cushier,¹⁰¹ Leopold,⁴⁰⁴ Picque,⁸⁵ Pozzi,⁵⁵ Prochownik,⁶⁹ Sänger,⁸¹⁷ Strong,⁹⁹ Zeiss,³¹⁷ Zinsmeister,³ and favorable reviews of the literature by Debierre,¹⁵⁴ Pozzi,⁵⁵ and Verchère.¹⁴

Spaeth,⁶⁹ Sept. 12, in discussing this operation, thinks it is indicated in about 7 per cent. of the cases of retrodisplacement; that is, in women with retroflexed and adherent uteri who still menstruate. The results of ventrofixation cannot properly be estimated until several years have elapsed. Leopold,³¹⁷ Mar. 10, advises the operation only in exceptional cases, where the ordinary treatment, including Schultze's method, is unsuccessful. Küstner,³¹⁷ Aug. 10, recommends the operation only as a last resort. In order to prevent the formation of re-adhesions, he separates them with the Paquelin cautery, whereby the danger of hæmorrhage is also lessened. He believes

that the patient is just as likely to abort if she becomes pregnant as when the uterus is retroflexed and adherent, and therefore does not recommend the operation during the child-bearing age. Sanger has noted a case where pregnancy had advanced to the sixth month without mishap.

Relations of Uterine Retrodeviations to Pregnancy.—Martin^{27 Oct.} questions whether retrodisplacements are so serious an obstacle to conception as is usually thought, and whether gravidity is such a dangerous condition. From a study of 129 cases, he concludes that congenital or acquired retroflexion is not the main obstacle to conception, but the congestion or endometritis which so often accompanies it. Most cases of retrodisplacement of the gravid uterus do not attract attention, and go on normally to term. In cases of incarceration, if replacement fails, it may be necessary to induce abortion or premature labor.

Prolapsus.—In a study of the etiology, Vignard^{298 Feb.} shows that in many cases there is an hereditary tendency to hernias in those liable to prolapse. Some patients suffer from nocturnal incontinence of urine in childhood. In about half the cases the onset is sudden and accompanied with a sensation of tearing, and in about half it is slow and gradual. Most cases occur in multiparæ, though not always immediately after delivery, the intervals in the cases studied varying from one to fifty-six years.

Uterine massage, for the relief of prolapsus, retrodisplacements, and weakening or contracture of the uterine ligaments, according to the method of Brandt, has been discussed *in extenso*, and favored by Fellner,^{118 May 12 et seq.} Boriakowski,^{586 No. 3} Semjännikow and Halbertsma,^{154 Sept. 15} Pawlik,^{817 Mar. 20} Weissenberg,^{817 June 1} Reibmayr,^{84 Mar. 9 et seq.} Alfred J. Smith,^{22 May 20} E. Leblond,^{35 Feb. 21} Macan,^{90 Mar. 20} Alfred Goenner.^{214 Feb. 1} Macnaughton Jones^{22 Mar. 27} enters a vigorous protest against the indiscriminate and unscientific employment of massage. He thinks the method is liable to fall into unscrupulous and unskillful hands, and is in serious danger of falling into disrepute. The application of massage to disease of the internal pelvic organs he would severely condemn. It seemed to him to bear a singular resemblance to masturbation. It is possible that good results may be obtained by it, but the treatment should only be carried out by a properly-trained physician. Koplik^{27 Feb.} calls attention to the dangers incurred by the use of Brandt's method. These are hæmorrhage,

rupture of adhesions, expression of pus from the tube into the peritoneal cavity, rupture of small follicular cysts of the ovary or of encapsulated collections of pus. There is always more or less risk in manipulating the tubes, even when they are not apparently diseased; so that it is better not to massage them. Boldt⁵⁷ gives a very good description of the technique and indications for massage. The contra-indications are all acute inflammatory processes, except some which might arise during treatment, dilated tubes, the presence or the suspected presence of pus. The indications are chronic and subacute para- and peri- metritis, all non-acute inflammatory conditions of the uterus, chronic and subacute oöphoritis, all displacements of the uterus, uterine hæmorrhages not dependent upon the condition of the interior of the uterus, incontinence of urine depending upon relaxation of the vesical sphincter, hæmatocele, floating kidney, prolapse of the rectum. The treatment is always to be begun by light massage, and ended in the same way. There is always a more or less painful sensation connected with it, and the physician must see that this is not excessive, though some little pain is necessary for a well-understood reason. We must, however, bear in mind to rather do too little than too much at one time. Never forget that the intra-vaginal finger is for no other purpose than that of support of the part to be treated, and, when changing the point of support, do not move the proximal end of the finger, and so avoid irritation of the introitus. Boldt concludes, from personal experience with the manual treatment, that cases of posterior displacement of long standing are exceedingly difficult to cure, especially if sharp flexion-angles are present. With prolapsus, however, he has accomplished most happy results, and records 2 cases of cure of complete procidentia. Sielski⁵⁸ believes that only the lifting up of the uterus has a genuine curative value. Starting from that supposition, he has considerably simplified Brandt's method. He uses an instrument which consists of an ordinary uterine sound bearing a circular flat disk an inch (2.5 centimetres) in diameter. This disk is fixed at a distance from the uterine end of the sound which varies according to the length of the uterine cavity in the individual case. Having introduced the instrument into the uterus, he carefully lifts it up, the os resting on the disk, from the pelvic into the abdominal cavity, carrying it up as high as possible without

causing marked pain. This is repeated daily. He has employed this method in several cases, obtaining complete cure in one and permanent benefit in the others.

Operative Treatment.—Péan,¹⁴ in view of the fact that the lateral portions of the vagina are normally fixed to the side of the pelvis with considerable firmness by means of dense connective tissue, this natural fixation being relaxed in prolapsus, proposes to re-establish it by an operative measure; the uterus being first replaced, he passes a double row of sutures along each side of the vagina through the recto-vaginal septum and the vesico-vaginal septum, respectively. Their application is facilitated by the use of long forceps, with one blade in the vagina and the other in the rectum or bladder. The sutures are removed in three weeks. By that time they will have cut through the tissue, inducing the formation of enough cicatricial tissue to act as an efficient support. The vaginal orifice is also narrowed, if torn.

Terrier has successfully performed ventrofixation for the relief of prolapsus, and Polaillon,³ notes a similar case, where, however, the patient died a week later from septic peritonitis.

Le Fort's operation has been studied by Charles E. Taft,⁵ who records a successful case and discusses the merits of the procedure. One great disadvantage of this operation is that, as it presents an effectual bar to sexual intercourse, its field must be exceedingly limited. Also it requires no small degree of judgment and mechanical skill to accurately fit one denuded surface to the other, and to fasten the sutures just tightly enough to hold the surfaces in contact, and yet not so tightly that they will cut out. It is possible that an obstruction of the ureters might take place from a careless insertion of the sutures. The puckering of the mucous membrane of the bladder near the openings of the ureters, which occasionally occludes their orifices after the more usual operations on the anterior vaginal wall, can hardly happen here. The advantages of the operation are many and manifest. Its greater part is done outside of the vagina; it is most easily performed in the dorsal position. If successful, absolutely no other treatment except an occasional douche for cleanliness is needed, and it is attended with but little more danger than an ordinary perineorrhaphy. When the union of the denuded surfaces is good, Taft believes there is decidedly less danger of recurrence than from

any other radical method. Berlin and Thomas speak in favor of the operation. It has been successfully done by Hicquet, Eustache, Zancarol, Duplay, Gueniot, Slaviansky, Neugebauer, Broomall, Smith, Cushier, Allen, and Berlin, each of whom has done several operations.

Extirpation of the uterus, with resection of the vagina, has been done by Asch⁹⁵_{Nov. 11} in 8 cases for the relief of complete prolapse. One of these cases died of a purulent cystitis, but the rest recovered and were cured. Several had been previously treated by Le Fort's method with no benefit. The redundant vagina in these cases was removed in such a way as to leave lateral vaginal flaps.

Inversion.—G. T. Harrison⁴⁰_{Nov.} records a case where a portion of the uterus was removed by mistake for a fibroid polypus. The patient recovered, and afterward died from sarcoma. W. Newman²_{Nov. 11} and H. R. Hatherly (collaborator) each report cases of long-standing inversion of the uterus reduced by the use of Aveling's sigmoid repositior. They also speak of the necessity of care in its use. Gowan⁶_{Sept. 11} suggests the use of a cupped rubber bag, placed in the vagina with the uterus resting in the cup, held in place by a frame-work of rubber bands. Then fluid or air is forced into the cup by any convenient means. This procedure is described as very efficient. Marcy⁹¹_{July 20} has devised an instrument consisting of a shaft with a cup-shaped extremity for the reception of the fundus, contained within a movable sleeve, which is provided with four small rings. Four strong silk ligatures are passed deeply through the cervical tissues and fastened to the rings on the instrument. Then, by means of a screw in the handle, pressure is brought to bear on a concealed spring by the action of which the fundus is pressed upward, the sutures serving as a means of counter-pressure, as well as assisting to dilate the cervical ring as the fundus is forced through it. The method was devised some twelve years ago, but has only been put in practice recently, when an inversion of three months' standing, in which prolonged taxis had failed, was reduced by the new method in twenty-six minutes with a pressure of eight pounds (3.6 kilos).

CERVICAL LACERATIONS.

Palliative Treatment.—The palliative measures of treatment are local, as applied to the uterus itself, and general, as directed to

the patient's physical condition. Of general treatment, the most important is a nutritious, easily-digested diet, together with tonic medication. A favorite prescription of Goodell's,¹ known as lemonade iron, is:—

R Strychninæ sulph., gr. ss (0.08 gramme).
Tinct. ferri chlor., ℥iv (14.8 grammes).
Acidi phosphorici diluti, ℥vj (22.2 grammes).
Syrupi limonis, q.s. ad ℥vj (177. cubic centimetres).
Dose, 2 teaspoonfuls t. i. d.

In nervous cases he employs the following:—

R Ammonii chloridi, ʒij (8. grammes).
Ammonii bromidi, ʒiv (15.5 grammes).
Tinct. gentianæ comp.,
Aquæ, ʒss ʒiij (88.7 grammes).
Dose, 2 teaspoonfuls t. i. d.

If anæmia is added to the nervous element of the case, a favorite pill, known as pil. sumbuli comp., is called for:—

R Extract. sumbuli,
Ferri sulph. exsiccata, . . . ʒss gr. j (0.06 gramme).
Asafetida, gr. ij (0.18 gramme).
Acidi arseniosi, gr. ʒv (0.0016 gramme).
Fiat pil. no. j.
Dose, 1 pill after meals, to be increased to 6 pills a day.

The local palliative treatment consists, first, in thorough cleanliness of the genitals; the vagina should be washed twice daily with a weak bichloride solution. The rent failing to heal by primary union, treatment should be directed to relieving the local congestion and to protecting as far as possible the exposed raw surface.

Mary E. Bates⁴⁴ considers that in many cases all the consequences of a laceration of the cervix can be avoided and overcome, and the laceration itself be repaired, before the patient arises from her bed. This she has accomplished in a number of cases by keeping the parts aseptic and the torn edges in accurate apposition, and the uterus supported by carefully-placed dry tampons of sublimated wool treated with iodoform and boracic acid. This is employed because it keeps sweet and pure for a considerable length of time, is soft, unirritating, easy of removal, does not interfere with drainage, and can be made to exert an even, elastic pressure,

which in itself is an efficient promoter of the involution process. The vagina is first douched with hot 1 to 8000 sublimate solution, the patient put in Sims's position, and cervix further cleansed, if necessary; the tampon is then placed on either side of the torn lips, so as to hold them in coaptation, and the third is placed below to support the whole. The packing should be large enough to keep its place, yet never tight enough to retain secretion in the uterus. On the second or third day these pads are carefully removed. The two granulating surfaces which were brought together at the first will now be found to have merged into one, which, if deemed best, may be touched with the nitrate of silver to repress exuberant granulation. The vagina should be cleansed and the tamponade adjusted as at first. Two or three days after, depending on the nature and the amount of the discharge, the second packing should be removed and the cicatrix touched again if necessary. If union is not solid, this tamponade should be repeated; if it is, a simple supporting tampon is inserted.

Operative Treatment.—Boldt²² seeks to prevent the later pathological changes which result from the presence of deep cervical tears by their early closure. This he accomplishes within a month after parturition by carefully scraping and freshening the torn surfaces and angles of the rent, after which catgut sutures are carefully and not too tightly placed. The operation is described as very simple, not requiring an anæsthetic, and scarcely necessitating rest in bed.

Duke⁶ prefers to accomplish the denudation in the ordinary cervix operation with chisel-shaped knives instead of scissors, claiming that with them the denudation is more easily, smoothly, and quickly accomplished, and without any danger of increased hæmorrhage.

Cleveland²³ has devised a glass plug to be used after trachelorrhaphy in cases where both lips have been amputated. It is perforated at a point 1 inch (2.5 centimetres) from its lower extremity, and is used in this way: After the deep sutures have all been introduced, but before they are twisted, another wire is passed through the anterior lip at a point in the middle, where it is intended the new os should be; this is passed through the perforation in the plug, and then through the posterior lip in the same relative position as in the anterior. The plug is then to be intro-

duced into the canal after the sutures are twisted, and is held in place by fastening the wire that passes through its perforation.

Goodell, ¹_{med.}, in fastening the sutures in this operation, employs perforated shot, slipped down over the sutures and clamped. To facilitate the removal of the stitches, the upper suture on each side is left several inches longer than the rest, which are cut on a level with the shot. These long sutures have an additional shot clamped over their ends to prevent injury to the mucous membrane of the vagina. When the time arrives for the removal of the sutures, all that is necessary is to introduce the speculum, and by means of traction on these two long wires the cervix is readily brought into view; the stitches are then very easily removed. The junior editor of this department has used this method with shot and silk-worm gut during the past year with most satisfactory results.

ENDOMETRITIS.

Diagnosis.—Schultze, ¹¹³_{Apr. 21}, ¹⁷⁰_{June} in 1880, first described what he called the diagnostic tampon. He is surprised that his method has not attracted a greater amount of attention, and re-affirms all that he has said as to its value. The tampon is made of absorbent cotton, soaked in 25-per-cent. solution of glycerite of tannin; this is firmly pressed into the vaginal vault, which has been previously cleaned, so that the vaginal portion of the cervix is completely covered. The glycerin abstracts water from the surrounding tissue and allows it to escape, together with the watery part of the secretion. After twenty-four or forty-eight hours the tampon is removed, and, if the uterus is healthy, only a small mass of clear vitreous cervical mucus will be found opposite the cervical opening. If any portion of the mucous membrane is secreting pus, this will be found on the tampon. It is not the quantity and watery character of the secretion that prove the presence of endometritis, but the pus therein contained. The quantity of the secretion is often so moderate that patients do not complain of it, and, if the cervix and vagina are not affected, a very considerable degree of endometritis may occasion so small a discharge that patients assure their physician in good faith that there is none. Schultze claims that, as uterine catarrh is one of the commonest diseases of the female genitals,—one of those which calls forth many reflex symptoms of disease in other organs,—it is important that its diagnosis should

not escape the physician, and that it is of especial value to possess a diagnostic expedient whose application does not require special gynaecological knowledge.

It seems to us that in most cases the diagnosis of chronic endometritis can be made without recourse to Schultze's tampon. In most cases the presence of a glairy, discolored mucus, which can be seen coming from the cervical canal, or which, on vaginal examination, clings to the finger, and may be drawn into threads by the separation of the latter, is conclusive. Together with this we usually have the history of profuse menstruation or of intermenstrual spotting. In cases where the endometritis is confined mainly to the fundus the discharge is thin and watery in character, discolored, and often possesses a peculiarly pungent, offensive odor. Besides these points, where hæmorrhage is a symptom, it is always right to ascertain the condition of the mucous membrane by the careful use of the dull curette.

Treatment.—Mary Putnam Jacobi, ²⁷ ~~May~~ ^{to July} who has for several years made an especial study of this subject, favors intra-uterine applications under certain restrictions. Intra-uterine treatment is required because disease of the endometrium rarely can be cured without it, and because in disease of the endometrium all other utero-ovarian disease originates. The treatment is not devoid of dangers, but is both possible and effective when these dangers are recognized and guarded against by suitable precautions. Intra-uterine cauterization, like all other topical irritating medications, always determines a dilatation of blood-vessels at a distance from the point of application. This corresponds to the zone of peri-inflammatory hyperæmia which surrounds every focus of inflammation. In this distant vascular effect lie at once a principal power for good and also the essential danger of the method. While topical medication of the cervical canal limits its influence to the surface to which a drug is applied, intra-uterine medication profoundly modifies the circulation and innervation of the sub-mucous and even peri-uterine tissues. In doing so it becomes dangerous precisely in proportion to the degree of peri-uterine hyperæmia which may have pre-existed. Nearly all the cases of accidents depend upon this circumstance. Proximity to a menstrual period, the presence of chronic peritonitis, oöphoritis, or salpingitis, or even an intense degree of engorgement of the peri-

uterine reservoirs and ovarian bulb, without inflammatory exudation, all tend to render intra-uterine medication dangerous because leading to excessive peri-uterine hyperæmia. Among all conditions of danger, proximity of the menstrual period is most important. The period of danger varies, but usually may be assumed to begin ten days after the close of menstruation, although unquestionably intra-uterine applications may, in many cases, be made with impunity much later. The period of choice, then, is within ten days after menstruation. Another important point is not to repeat the treatment too often during one menstrual cycle. The rule must be never to make two applications in one month, until tolerance of one has been well established. Again, the continuance of treatment through too many successive months will also do more harm than good. After three months it is usually advisable to suspend intra-uterine medication for a time. Other forms of treatment can in the meanwhile be continued with profit. If an intra-uterine application be followed by an unusual intensity or duration of pain a day or two later, it is very common to find some degree of swelling in the lateral or posterior *cul-de-sac*; sometimes this only indicates swelling of the vascular connective tissue and peri-uterine plexus, but if there have been severe cramps it may imply that fluids have been squeezed out of the tubes, exciting a circumscribed peritonitis. This may develop without fever and exist without much conscious aggravation of the patient's condition. Local applications of iodine or the constant galvanic current will dissipate these small swellings rapidly; but they necessitate interruption of intra-uterine treatment for at least three months, sometimes much longer. Intra-uterine medication should be regarded as a surgical procedure, should be made at the patient's house, and the patient put to bed and kept there from six hours to six days, according to the severity of the reaction. The application should usually be preceded by rapid dilatation. In some cases it is better to use laminaria tents than steel dilators. These are cases of spasmodic dysmenorrhœa without intermenstrual symptoms, and where there is great sensitiveness just at the internal os, and cases of chronic metritis without marked subinvolution. The author prefers iodine or iodized phenol to any other drug. The indications for the choice of remedies may be thus formulated: When it is desired to obtain the remote effect

on the parenchymatous circulation of the uterus, which results from cauterization of the endometrium, tincture of iodine or iodized phenol is required. When a superficial action is needed on abraded, hyperæmic surfaces, or on ulceration with papillary granulations, iodoform is preferable. Iodine preparations are more often indicated for the uterine cavity and after dilatation; iodoform, for cervical catarrhs and erosions. The absence of irritation after the employment of the latter allows it to be repeated at short intervals.

Dumontpallier¹⁰⁰_{June 11, July 20} strongly advocates the treatment of endometritis by the use of pencils of chloride of zinc (Canquoin's paste), claiming to have effected a cure without an accident in 96 out of 100 cases. To employ the method, the vagina is first disinfected and an aseptic sound introduced to get the direction and depth of the uterine cavity. Having done this, a pencil of the zinc is passed up until it touches the fundus. A small vaginal tampon is then put into place to retain it and to protect the vagina from the caustic action. The results of this treatment were remarkable: in hæmorrhagic endometritis the bleeding was stopped at once, and in the purulent forms the pus soon disappeared. Pain produced is rather severe at first, but soon becomes tolerable. There is no reactionary fever. The slough produced by the caustic usually comes away in from five to nine days. The after-treatment consists merely in antiseptic douching until after the separation of the slough. The menses were not interfered with in any case, and in 2 cases the patients became pregnant soon after this treatment. The chloride-of-zinc treatment is also favored by Bock,⁶_{Oct. 15} who notes a series of cases where very satisfactory results were obtained; by Hugo Marcus,⁷⁹⁰_{Dec. 29, '98} and by Polaillon.⁶⁴⁸_{July 24} Blumenthal,⁴¹_{Mar. 20} on the contrary, would only employ it as a last resort, claiming that from the severity of its action it is a dangerous and uncontrollable agent, and that its use is followed by troublesome contraction of the canal.

Roux and Schnell⁴⁸_{May; Nov.} affirm that the treatment by iodoform gives extremely good results. The drug may be employed in pencils or by injection. The pencils are prepared by incorporating the iodoform with a mixture of gum arabic, gum tragacanth, and butter of cacao or gelatin. For butter of cacao the proportion of iodoform should be 1 to 7; with gelatin, 2 parts in 8. The

pencils are introduced into the uterine cavity by means of forceps directed by two fingers of the left hand in the vagina. The injections may be made by forming an emulsion of iodoform with oil or glycerin and a solution of gum tragacanth. This can be injected through a hollow sound by means of a small syringe. All instruments should be carefully disinfected before use. Jacobs²⁵⁶_{July 20} and Terrier⁷⁰⁰_{Oct. 19} indorse this treatment, but Terrier sometimes employs resorcin or salol in place of iodoform. Bichloride may be used according to the following formula:—

R Hydrarg. bichlor.,	. . . .	gr. viij (0.5 gramme).
Cretæ precip.,	. . . .	℥viss (0.43 gramme).
Tragacanth.,	. . . .	℥iij (93.8 grammes).
Glycerini,		
Aquæ,	. . . .	aa q.s.

For 50 pencils.

Swiecicki²⁹⁷_{Feb. 17}⁷⁰⁰_{Oct. 19} recommends, in cases where the uterine mucosa is hyperæmic, swollen and puffy, with increased secretion, the application of a solution of morphine three times a day to the uterine cavity. This is to be continued for from three to four weeks, and Swiecicki reports most excellent results. This treatment seems to us to be inadvisable and uncalled for on account of the frequency of the applications, the nature of the drug used, and the fact that other methods would certainly produce equally favorable results.

De Lostalot¹⁴_{Apr. 17} noticed that a laminaria tent which he removed from a patient suffering with endometritis was covered with a cast of the mucosa. This unexpected caustic action was explained as follows: The tents had been soaked in a bichloride solution, 1 to 1000, and then put into iodoform and ether. When in contact with the alkaline mucosa of the uterus, a decomposition resulted, by which, with other products, red iodide of mercury was formed, which produced the caustic action. The results obtained when these tents were afterward purposely used were very good, and the author considers that they may in many cases be employed instead of the curette or some other caustic.

Dilatation by tents previous to curetting is much favored by Terrillon. Liachnitski²⁸⁶_{Jan.} has found, by extensive experiments, that dry heat is the best and most certain way of rendering tents aseptic.

Andrew F. Currier⁴⁰_{Apr.} discusses the indications for the use of the curette both for diagnostic and therapeutic purposes. The

chief indication for its use is uterine hæmorrhage, proceeding from (a) diseased mucous membrane, (b) diseases affecting the parenchyma of the uterus, (c) diseases of the uterine adnexa, (d) diseases of the pelvic peritoneum or cellular tissue, (e) stasis from uterine displacement, (f) new growths and adventitious tissue in the uterine canal. He concludes that there is no form of treatment for uterine hæmorrhage accompanied by hyperplasia or chronic inflammatory changes in the mucous membrane so satisfactory as careful and thorough curetting under anæsthesia, with proper antiseptic precautions, and immediately followed by the application of an astringent or caustic antiseptic solution. Other papers in favor of the curette are by Engelmann,⁷⁸⁶ R. A. Gibbons,¹⁵ W. L. Taylor,¹¹² W. W. Taylor,⁷⁴ Terrillon,⁶⁷ Finkelstein,¹⁰¹⁰ Alloway,²⁸² Fraipont,²⁸⁸ B. F. Baer,⁹ recommends, after curetting for fungous endometritis, a mixture of equal parts of nux vomica and fluid extract of ergot, 40 minims, after each meal; also, ammonium chloride, in 10-grain doses, three times a day. Trélat,² and Chevalier and Rolland,²²⁸ each note several cases of acute peri-uterine inflammation which resisted treatment until the curette was employed, when it disappeared almost immediately.

Chronic Tubercular Endometritis.—According to Jouin,¹⁴ this is a much more common disease than secondary tubercular degenerations of the rest of the female genital system. It also has symptoms that are peculiar to itself and important to recognize, as a failure to do so leads to an imperfect method of treatment. The predisposing causes of this affection are those of tuberculosis in general; local causes are lesions of the os uteri, the use of linen that may have been soiled by the sputum of tubercular patients, badly-cleaned instruments, but, above all, sexual intercourse with tubercular subjects. It is possible that tubercular endometritis may be a cause of the gleet seen in men who have phthisical wives. The symptoms are leucorrhœa, pain in the lower part of the abdomen, and constipation. Sterility is usual. The uterus is markedly increased in size; the os uteri is red, sometimes eroded from the passage of a more or less bloody fluid. A microscopic examination of fragments of the uterine mucosa gives the characteristic tubercle bacilli. The patient has also the usual general signs of tuberculosis. When the disease is not treated it tends to become general. When it first appears it is quite amenable to treatment,

but after other organs are affected prognosis is serious. For treatment, Jouin recommends the use of creasote and the intra-uterine employment of iodoform. Besides these, the general medical treatment of tuberculosis should be employed and sexual intercourse prohibited until the disease is cured.

FIBROMATA.

Pathology.—Rosa H. Engert⁵⁰ holds that a fibroid is nothing more or less than an organized giant thrombus. Wherever hæmatoma happens to form, nature will try to bring life into the extravasated blood-coagula by organization. She substantiates this hypothesis by citing some of the latest researches by Welch in regard to the organization of thrombi. He states that in a thrombus of five minutes' existence blood-corpuscles were found, but in a state of degeneration. Leucocytes were only sparingly visible. Half an hour later they had increased considerably in number. Fibrin appeared in from five to thirty minutes in the form of strips and islets between the blood-corpuscles and on the surface of the blood-coagula. Gradually it formed a net-work, and twenty-four hours from the beginning of the process a great part of the thrombus consisted of fibrin. Heuknig holds that the first process in the organization of a thrombus is the conversion of the blood into a fine, granular mass, which becomes striated. Canalization takes place from the line of demarkation from the border of the vessel-wall; proliferation of the endothelium begins and gradually covers that part of the thrombus which does not adhere to the surrounding wall. Underneath this cover a layer of connective tissue develops; the endothelium begins to grow into the thrombus and capillaries are formed. Another set of capillaries develops from the vasa vasorum of the vessel in that particular thrombus which adheres to the vessel-wall. Gradually the connective tissue increases, while the thrombus decreases. A similar view is held by Walton.⁵²

Lawson Tait⁴⁹ urges the necessity of recognizing, what he had pointed out eighteen years ago, that two separate and distinct diseases are confounded under the term myoma, or fibroid. There is the multinodular myoma, which is distinct in its etiology, pathology, and surgical treatment from the rapidly-growing, soft, œdematous myoma. The œdematous myoma occurs at any age, while he has never seen a multinodular myoma which called for

removal under 30 or after 50. The removal of the appendages will not arrest or lessen the growth of the soft myoma, while in the other class of cases it does both. Tait²_{Aug. 10} also, while pleading for carefulness in this same matter, asserts that "exact diagnosis in the abdomen is an impossibility, and only the rash and inexperienced assert the contrary."

In tumors that are slow in growth uterine symptoms are usually absent. If pain and general discomfort are present, the endometrium or the uterine appendages are usually involved. Wylie⁹⁹_{Oct. 21} says that in women over 40 years of age small uterine tumors may delay the menopause, but otherwise are not usually significant. Pain and failing health at the time of the menopause are usually indications that degeneration is taking place, and hysterectomy may be indicated. Fibroid tumors, like all organic structures, have their periods of growth and decay. The life of a fibroid is generally of from two to eight years. A tumor may be quite large and yet give rise to no symptoms. Should it, after a period of quietude, begin to grow again, it may then require removal. Severe symptoms of pressure, degeneration, or suppuration are indications for operative treatment.

Martin,²⁸_{Feb.} in speaking of the degeneration of fibroids, notes, in addition to cases where fatty degeneration is prominent, cases of calcification, of suppuration, of extensive œdema, of cystic degeneration, of teleangiectatic degeneration, and (in 6) cases of sarcomatous degeneration. This sarcomatous degeneration is worthy of attention from the fact that in all these cases the patients had been for a long time under treatment by ergotin. In them the abnormal hæmorrhages had been completely overcome; but the tumors themselves, after an apparent reduction in their volume, could not be restrained in their transformation. Cushing⁵⁹_{Mar. 22} also notes an instance of fibro-sarcoma of the uterus. Martin notes in 9 cases the complication of myoma with carcinoma. The carcinoma had in some cases extended into the cavity of the uterus without standing in any demonstrable relation or connection with the myoma. He thinks that all investigations which endeavor to demonstrate the destruction of a myoma by carcinoma have been unsuccessful, although myoma and carcinoma may occur together. Coe⁷⁷_{and} Liebmann,³¹⁷₂₀
_{Nov. 17; July} however, have noted cases of cancerous degeneration of a uterine fibroid where the diagnosis was confirmed by a

careful microscopical examination, which showed groups of round cells invading the general fibrous structure.

In answer to the question, whether persons suffering from uterine myomata are especially liable to malignant disease, G. T. Beatson²¹⁸_{Aug.} holds that a myoma may become the seat of primary cancer apart from secondary extension to it from the uterus or other organ, but that in itself it has probably no more proneness to that disease than the normal uterine tissue. So far as can be gathered, pathologists of the present day believe that myomata and carcinomata are not associated together with any such frequency as to clearly establish any relationship.

Stratz³⁹⁸_{Nov.}⁵ reports a unique case of amyloid degeneration of an intra-uterine polypus. Microscopical examination of the small fibrous polypus showed that its vessel-walls had undergone extensive amyloid degeneration. The patient was in robust health and exhibited no evidences of visceral diseases. A similar condition has been noted by Buron in a fibroma of the larynx, but never before in a neoplasm of the genital tract. The cause is unknown. The discovery of such a change in a uterine polyp would lead us to suspect the possible existence of a similar degeneration of other viscera.

Klasson,⁴⁶_{Feb. et seq.} in discussing false polyps of the uterus, states that, besides the two classes of benignant non-recurring uterine tumors commonly known as fibrinous and mucous polyps, there is a class of pathological formations giving the same symptoms, but of very different structure. They are the results of retained membranes or blood-clots, occur most frequently after abortions, are very variable in consistence and situation, remain latent for a long time, and are exceedingly difficult of diagnosis. They may be formed from layers of coagulated blood superimposed on the obliterating thrombi of the uterine sinuses after delivery, or on bits of retained and adherent placenta, and may even grow to a large size. Many cases of hæmorrhage, three or four months after delivery, are due to these growths, which do not irritate until involution has reached a degree sufficient to cause drawing on their attachments and consequent opening of the sinuses. Other growths arise from the organization of retained membrane, the retention being caused by endometritis or by reason of the greater adherence in the early months. He cites a number of cases,

showing that all these varieties of polyps may occur, and that their symptoms may appear so late as to completely mask their origin.

Treatment (Medical).—Lucas-Championnière³⁵, states that he has tried ergotin and other drugs recommended, but has had satisfactory results only after the use of savin (*Juniperus sabina*). Of this he gives 50 centigrammes (8 minims) daily, in divided doses, at intervals of three hours; the treatment extends over months or years, the drug being omitted during each third month and at the menstrual periods. Beneficial results are always obtained. The tumors diminish, pain disappears, menstruation becomes regular, the functions of the bladder are restored, and appetite and digestion improved.

Treatment (Electrical).—Among the very large number of authors who have written during the past year on this subject, we note the following as advocating Apostoli's method: T. A. Ashby,¹⁰⁴ J. H. Aveling,² J. Batuaud,¹⁴⁸ H. R. Bigelow,⁹ J. W. Bovee,⁸¹ T. H. Bradford,⁸⁰ Black,²⁸⁴ J. R. Buist,²⁷ J. E. Burton,¹⁸⁷ P. Bröse,⁶⁹ A. B. Carpenter,⁵³ Championnière,¹⁴ Cholmogoroff,⁵⁸⁶ Clementi,⁵⁷ W. E. B. Davis,⁶⁴⁷ Delétang,¹⁰⁰ Delasus,²²⁰ Durante and Trombetta,⁵⁷ George J. Engelmann,⁷⁸⁸ Fauquez,¹⁰⁸ W. Fischel,¹¹⁸ G. Gautier,²⁴ A. H. Goelet,¹ Thomas Keith,² La Torre,²³⁶ Lewandowski,⁸ McClure,⁶ More-Madden,² E. Noeggerath,⁴ E. L. Orleman,¹⁸² W. S. Playfair,² Laphorn Smith,²¹⁶ Trélat,³ W. H. Walling.⁷⁸⁰

On the opposite side we find Tait,² Imlach,² Chadwick,²⁷ Wylie,²⁷ and a few other surgeons, most of whom condemn the method without having given it a thorough trial. While ultra-enthusiasm and too great expectations have undoubtedly led to failure or disappointment in the use of electricity, there can be no question of its importance as a palliative therapeutic agent. When carefully employed the treatment is generally considered to be free from any danger to life, unless electro-puncture be the method. Most of the unsatisfactory results have been in the case of tumors which have proved cystic—a condition which absolutely contraindicates the use of electricity—or in cases where the proper precautions in regard to cleanliness or asepsis were not employed.

The consensus of opinion is practically that expressed by Delétang,¹⁷ who states that the immediate effects of electrolysis consist in (1) contraction of the uterus and its tumors; (2) a

congestion of the adjacent tissues, which continues for several hours and is attended with colic; (3) a subsidence of pre-existing hæmorrhages. The consecutive effects are: 1. Slight hæmorrhage. 2. Pain with functional disturbance. These phenomena have no relation to the tumor, belonging rather to the inflammatory zone surrounding it, and quickly pass away. 3. The tumor diminishes, the morbid symptoms disappear, and the general nutrition improves. There is sometimes a temporary aggravation of the symptoms at the commencement of the treatment, depending on the congestion mentioned above.

Some knowledge of electro-physics, carefulness in manipulation, and exactness in dose are necessary to the effective employment of galvanism, together with a proper selection of the cases and accurate knowledge of the tumors to be treated. Ordinarily, no fibroid should be attacked by galvano-puncture when it is possible to reach it through the uterine canal. When the tumor can only be reached by puncture, this should be either through the cervix or the vaginal wall, using particular care to determine beforehand the position of the bladder, so that it may be avoided. No tumor in which there is a suspicion of cystic degeneration should be treated by electrolysis. The current must be localized and its effects confined as closely as possible to the neoplasm. One pole must serve as the active agent for the application of the electricity, and upon this its entire effect is concentrated. This is termed the active pole. The current at the opposite pole is to be dispersed over as large a surface as possible, so that its effects will be least perceptible. The poles should be placed on opposite sides of the diseased part and as near to it as possible, the indifferent pole being placed on the largest and least-sensitive surface. The current should be of sufficient strength to accomplish the object desired in the shortest possible time without detriment to the patient. This strength will usually be from 80 to 250 milliampères. The first instrument required is a battery of sufficient constancy and strength. One which has been found most serviceable is composed of fifty or sixty improved Law or Leclanché cells. These can be stored in any closet, or even in the cellar, connected in series with wires leading to any convenient spot in the office. Here we need a rheostat for the purpose of controlling the current strength, and an ampère-meter for measuring the amount used. In addition to these, there

are the connecting cords, the abdominal and the internal electrodes. The abdominal electrode may be the original one of clay, originally devised by Apostoli, or a thin plate of lead or tin (Engelmann⁷⁸⁶), as large as can be used upon the abdomen, covered with a thin layer of soft clay, held in place by gauze; or it may be made of gauze covered with wet canton-flannel, or thin, soft buckskin, held in place on the abdomen by a quilted sand-bag. The internal electrode is either a gold- or platinum-plated sound, or a curved rod of carbon, or, for electro-puncture, a strong steel needle, insulated to within $\frac{1}{2}$ inch (12.5 millimetres) of the point.

If electro-puncture is to be employed, or the patient is hyperæsthetic or nervous, anæsthesia will be necessary; but, ordinarily, if skillfully and carefully used, the current may be passed without an anæsthetic. The patient is to be put upon the operating-table or chair in the dorsal decubitus, the clothing loosened about the waist, the corset removed; the abdominal electrode, previously soaked in warm water, is then snugly adapted to the abdomen, so that the epidermal layers of the skin may have a chance to become thoroughly moistened, the current then passing with much less resistance and consequently less pain. Before placing this electrode, any scratches, pimples, or excrescences should be covered with bits of plaster or oiled silk, as otherwise the passage of the current will cause much pain at these points. Warm, dry towels should be placed over and above the electrode to protect other portions of the patient's body, as well as her garments, from any excess of moisture. The vagina should now be cleansed by an antiseptic douche and the uterine electrode carefully introduced; or, if galvano-puncture is to be employed, the needle is introduced to the depth of from 1 inch to $1\frac{1}{2}$ inches (25 to 37 millimetres) at a point previously determined. Being certain that the rheostat is at its greatest point of resistance, the connecting cords are now attached to the electrodes and the current turned on very slowly and evenly, so that in the course of a minute we have increased it from nothing up to 50 or 100 milliampères or more. The first sitting should not be for a longer time than six minutes, the current remaining at its strongest for half of this time, and then being slowly reduced. During the passage of the current the operator must constantly observe both his galvanometer and the patient. The needle should remain perfectly steady, with no oscillations

which would indicate jar or shock. The operator must be particularly careful to avoid any accident which might produce a sudden change in the intensity of the current, as the shocks thus produced are exceedingly trying. At the end of the sitting the vagina should be again douched and the patient kept in bed for the rest of the day. If there are evidences of pain or reaction, or, in susceptible individuals, it is well to insist upon rest in bed for several days, together with the use of the ice-bag over the region of the tumor. Should there be any bleeding, it may be necessary to tampon the vagina with styptic cotton. The necessity for this, however, is rare. We must always warn the patient of what is coming; we must first apply the moistened, warm, dispersing electrode to the abdomen; we must have the intra-pelvic electrode aseptic, and introduce it with the greatest possible gentleness; we must thoroughly insulate all but the active portion of the instrument, avoiding metallic contact with vagina, vulva, or speculum, and never establish the current until intra-pelvic disturbance has ceased; always increase the current very gradually, bearing in mind that the intra-uterine or intra-pelvic pole must never cause pain. All shock must be avoided, the connections made before the current is established, and not broken until it is entirely turned off.

Electro-puncture is always attended with a certain amount of risk, and is condemned by the greater number of writers. Inglis Parsons,²_{Apr. 13} Laphorn Smith,¹³⁰_{June} Baraduc,²⁴_{Sept. 3 of seq.} and Mundé report favorable results from its use.

Baraduc advocates the treatment of interstitial fibroids by what he calls lymph-drainage by galvano-caustic perforation of the capsule of the tumor. This he does by means of a small button-shaped electrode attached to the positive pole, using a current of from 80 to 150 milliampères, and reports very favorable results.

In discussing the prognosis of myoma operations, Theodore Landau³¹⁷_{Mar. 16} states that the long-continued previous use of medical agents materially reduces the patient's chances of recovery by producing degenerative changes in the heart-muscle. These changes are produced by ergot or ergotin, which practically produces chronic ergot poisoning, by savin and by iodine.

Treatment (Surgical).—Mundé, in a paper on the nature and limitation of operative treatment of uterine fibroids,²⁷_{Oct.} states that there is a tendency among the profession at large to look

upon all uterine fibroids as requiring some kind of treatment. He questions whether the pathological importance and injurious influence of these tumors warrant the extravagant enthusiasm accorded to their conservative treatment by galvanism. He thought the relative value of the treatment exaggerated and its indications extended beyond absolute necessity. His conclusions were based upon a study of 123 cases of uterine fibroid which he had seen during the last three years. Of these, 61 gave so little trouble that no treatment of any kind was thought necessary. In the remaining 62 cases the call for treatment depended upon the location of the tumor and the symptoms produced. Subperitoneal tumors seldom call for treatment except for pressure symptoms; interstitial or submucous, for pressure or menorrhagic; cervical, for interference with defecation, micturition, parturition, coition, or for the bloody discharge to which they may rise. He warns against the premature operative removal of sessile fibroids *per vaginam*, when a few months' oxytocic treatment will often render them easily accessible through the dilated cervix. Fibroid growths of the uterus, situated near the fundus uteri and showing no tendency to downward development, if requiring active treatment, are best reached from the abdominal cavity. Tumors situated near the internal os, which, under the influence of oxytocic measures or of their own accord, show an inclination to dilate that orifice and encroach upon the cervical canal, can almost always, after due preparation, be safely removed *per vaginam*. About one-half of all fibroid tumors which come under the observation of the physician require no active treatment of any kind. Only rapidly-growing subperitoneal or interstitial tumors call for or are benefited by galvanic treatment. The removal by the sharp curette of the hypertrophied mucous membrane of the uterine cavity will often, at least temporarily, relieve the menorrhagia, which is the chief symptom caused by the interstitial variety. Enucleation, after splitting the capsule by means of traction by the finger and some blunt instrument, offers a safe means of cure in cases of interstitial, cervical, and submucous corporeal tumors. Certain interstitial tumors which are so situated as not to be affected by the pressing influence of ergot and depreciating the general health by profuse uncontrollable hæmorrhage, and certain cases of rapidly-growing subperitoneal tumors in which a thin pedicle can-

not readily be formed, may require the removal of the ovaries to check the hæmorrhage and the growth of the tumor. Laparo-hysterectomy should never be performed merely to relieve the patient of a fibroid tumor which does not affect her general health, and is merely inconvenient or unsightly. The nearer the menopause, the less likely is the fibroid to grow or cause trouble, and therefore, other things being equal, less likely to call for active operative interference.

V. Stäheli²¹⁴_{Sept. 15} reports 16 cases where double oöphorectomy was done for the relief of hæmorrhage and other symptoms caused by the presence of inoperable fibroids, and after ineffectual treatment by other methods. Ages of the patients ranged from 29 to 48 years, and the duration of the symptoms from four months to nineteen years. There were 2 deaths and 2 cases where the hæmorrhages recurred; the rest were cured. Other successful cases are reported by Salzer,⁶⁵⁰_{Dec. 4, '90} Edis,²_{Nov. 28} Loreta,²_{Apr. 2} and V. O. Hardon.²⁰⁷_{Aug.} Lawson Tait⁸²_{Mar.} reviews his experience as follows: In July, 1872, he removed the appendages in a case of bleeding fibroid; in a few months the hæmorrhage ceased, and the patient is now alive and well. Since that operation Tait has removed the appendages 272 times, with 12 deaths, giving a total average mortality of 4.41 per cent. From July 21, 1885, to the present time, he has operated 154 times with only 2 deaths. He maintains, as he did in January, 1882, that, as far as its primary results are concerned, removal of the uterine appendages for the arrest of intractable uterine hæmorrhage is a procedure which is as easily justified as any of the major operations of surgery. He is satisfied with the secondary results. Of the 50 cases recorded in 1852 only 2 have proved through their after-history to be failures. In one of the latter the tumor was a soft œdematous myoma. In Tait's whole series, 6 cases where the tumor was of this nature received no benefit from oöphorectomy. In the entire series of 262 cases of uterine myoma, where the operator had removed the appendages between December, 1880, and February, 1889, 4 died. Of the series, 1 case was under 20, 29 cases were between 20 and 30, 113 between 30 and 40, 113 between 40 and 50, and 6 were 50 or older. In 2 cases the tumors were reduced in size, but hæmorrhage recurred through the presence of a small polypus. On removal of that growth it ceased.

than laparotomy. As the first condition, all operators demand a short, wide, soft cervix. This may be correct when very large tumors are involved, but he advises enucleation in ordinary-sized tumors whenever it seems feasible to deliver them without great force. For this purpose a capacity for dilatation of the cervix suffices. He begins dilatation by tupelo tents. When the cervix is almost dilated he increases the opening by making with scissors five or six radiating incisions, which are stitched after the operation. The best time for operation is immediately after the menstrual period. Submucous fibroids are the most suitable, but he has enucleated two multiple subserous tumors. Instruments should be avoided, as the finger should do most of the work. A speculum is rarely used; the cervix is grasped high up by strong tenacula and the uterus drawn down. The capsular incision is best made across the point where the tumor clearly leaves the uterine wall. In high tumors the most accessible point is chosen. The splitting is done by a probe-pointed knife or curved, blunt-pointed scissors, the incision being widened by the finger or a dull instrument like a scalpel-handle. Enucleation should be accomplished with the fingers. There should rarely be any cutting. But little force should be used, though instruments for grasping the tumor securely are required. Very large tumors may be compressed by the cephalotribe or cranioclast, or they may be removed piecemeal after applying an elastic ligature. Before operation the external genitals and vagina are rendered aseptic; an iodoform pencil is introduced into the uterus and an iodoform tampon into the vagina. This latter is removed just before operation. During operation irrigation with a weak solution of salicylic acid is employed. The hands are disinfected with sublimate. After enucleation the uterine cavity is thoroughly cleansed and irrigated with the sublimate solution. The uterus is loosely tamponed with iodoform gauze, and ergotin is given subcutaneously. The dressing is not removed until the fifth day unless there is a rise of temperature. Chrobak has published 20 cases, of which 1 died.

Laparotomy.—The treatment of the pedicle in laparotomy is still the main point of issue, and there can be no question but that it is the most important. Bantock,⁴⁰ in discussing the matter, says certain cases of pedunculated fibroid might be treated by ligating and dropping the pedicle, but some pedicles would be insecure and

dangerous, no matter how carefully they were tied. He had tried both plans, and it was his want of success with the ligature that had led him to have recourse almost invariably to the extra-peritoneal treatment. He had used the most powerful forceps; had compressed the pedicle to an eighth of its original volume; had applied the double ligature, transfixing it, in addition, to a circular ligature; and had even stitched the peritoneal edges together; yet, before the operation had been completed, oozing had often begun. He insisted on the fact that patients did not usually die from the hæmorrhage, as such, but from septicæmia due to the decomposition of the ooze. That was why the use of a drainage-tube was advised. It must be that they feared the oozing from the stump of the pedicle, for there was nowhere else it could come from. He would be very glad if a method could be devised to overcome the difficulties and drawbacks, as the recovery took much less time; but he had heard of no method which would give such assurance against hæmorrhage as that obtained from the extra-abdominal method. Lawson Tait⁴⁹ holds that even the most tempting-looking pedicles cannot be relied on, because uterine tissue is so laden with serum that, even if tied ever so tightly, it would begin to bleed in twenty-four hours. He had tied some 6000 pedicles, and, while he has never had hæmorrhage from ovarian pedicles except in 1 or 2 cases, it was quite another thing with the pedicles of fibroids. He regretted nothing so much as having been induced to try the intra-peritoneal treatment of the pedicle. Even hydraulic pressure would not render them secure, and he had employed pressure up to 3 tons. At present, all that his nurses had to do was to give a turn to the clamp whenever oozing set in. They were not secure until the lapse of eighty or ninety hours. It was true that certain cases might be safely treated by ligature, but it was impossible to distinguish them prior to operation.

Hector Treub,⁷⁹⁰ who has performed 17 cases of supra-vaginal amputation for myoma, with 2 deaths, attributes his success to the simplicity and rapidity of his operations. After removing the uterus, he swabs out what is left of the uterine canal, dusts the pedicle with iodoform, and drops it. He does not wait to stitch the peritoneum over it, as he thinks that would prevent the rapid absorption of secretion.

Fritsch,⁸¹⁷ employs a modified extra-peritoneal method. This

LAPAROTOMY FOR FIBROIDS.

Where Reported.	Operator.	No. Cases.	Nat. of Growth.	Operation.	Pedicle.	Result.
Wiener Med. Presse, January 13.....	E. Albert.....	10	Myomata.	Sup.-vag. hyster.	Extraperit.	All recovered.
University Med. Magazine, February.....	J. B. Baer.....	1	Myoma.	Enucleation.	Dropped.	Recovered. No bleeding, and no ligament or clamp used.
Medical News, October 19.....	J. M. Baily.....	1	Fibro-cyst.	Abd. hyster.	Extraperit.	Recovered.
British Gynaecological Journal, November.....	J. M. Baily.....	1	Fibro-cyst.	Supra-vag. amp.	Extraperit.	Recovered.
British Gynaecological Journal, Nov. 25.....	Barnes.....	2	Fibroid.	Abd. hyster.	Extraperit.	Recovered.
British Press and Circular, December 26.....	Barnes.....	1	Fibroid.	Abd. hyster.	Closed over with perit. and dropped.	Recovered.
British Gynaecological Journal.....	Faneux-Barne.....	1	Cic. ut. bl. at.	Laparotomy.	.....	Died on sixth day. Previous renal insufficiency.
Rev. Gen. de Clinique et de Therap., Apr. 4.....	Le Bec.....	2	Fibroid.	Supra-vag. amp.	Extraperit.	1 died. Heart failure.
Medical and Surgical Reporter, June 8.....	D. Benjamin.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Boston Medical and Surg. Jour., April 4.....	E. Berol.....	1	Fibroid.	Supra-vag. amp.	Closed by four sut. Drain thro. vag.	Recovered.
Wiener Medizinische Wochenschrift, Apr. 6.....	C. Braun.....	2	Fibroid.	Enucleation.	.....	Recovered.
Jour. Anat. Med. de Bordeaux, March 15.....	H. T. Byford.....	1	Fibroid.	Abd. hyster.	Dropped.	Death from acute peritonitis.
Journal de Med. de Bordeaux, Sept. 22.....	E. C. Dudley.....	1	Fibroid.	Enucleation.	Intraperit.	Recovered.
American Journal of Obstetrics, Dec. '78.....	E. C. Dudley.....	1	Fibroid.	Enucleation.	Extraperit.	Recovered.
Medical Standard, October.....	R. Douglas.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Journal de Med. de Bordeaux, Sept. 13.....	Dunon.....	1	Fibro-cyst.	Enucleation.	Extraperit.	Recovered.
British Medical Journal, November 28.....	Edis.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Correspondenzblatt f. Schw. Aerzte, Nov. 1.....	Fehling.....	3	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Journal de Medecine de Paris, April 21.....	J. A. Fort.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Centralblatt f. Gynaecologie, Dec. 8, '85.....	C. W. Freund.....	1	Myoma.	Supra-vag. amp.	Extraperit.	Recovered.
Weekly Medical Review.....	P. A. Glasgow.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Minchener Med. Wochenschrift, Mar. 5.....	Gochel.....	1	Fibroid.	Supra-vag. amp.	Covered with perit. and dropped.	Recovered.
New York Medical Journal, February.....	J. R. Goff.....	1	Fibroid.	Supra-vag. amp.	.....	Temp. poisoning from boric acid in dressing.
Boston Med. and Surg. Jour., Jan. 24.....	J. Homann.....	1	Fibroid.	Supra-vag. amp.	Dropped.	Drainage through cervix.
Kansas City Medical Record, October.....	George Halley.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Journal d'Accouch., July 30.....	J. H. Jacob.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
British Gynaecological Journal, May.....	F. B. Jassett.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Journal Amer. Med. Association, June 22.....	J. T. Johnson.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Journal de Med. de Bordeaux, July 18.....	C. C. Jozan.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Died. Intestinal obstruction.
Amer. Journal of Obstetrics, June.....	More Madden.....	11	Fibroid.	Enucleation.	Covered with perit. and dropped.	10 recovered, 1 died.
Medical Record, November 9.....	E. E. Montgomery.....	1	Soft myoma.	Supra-vag. amp.	Extraperit.	Died fourth day from peritonitis.
Philadelphia Medical Times, March 15.....	McMorris.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
British Medical Journal, December 15, '88.....	J. H. Pockard.....	1	Fibroid.	Laparotomy.	Extraperit.	Recovered.
Weekly Medical Review, December 29, '88.....	A. Pollio.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Corresponding Editor.....	H. C. Pearce.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
Journal American Med. Association.....	Polhem.....	1	Fibroid.	Enucleation.	Extraperit.	Recovered.
Wiener Medizin. Wochenschrift, Oct. 22.....	C. B. Porter.....	1	Fibro-cyst.	Supra-vag. amp.	Dropped.	Recovered.
Boston Med. and Surg. Journal, April 18.....	Bufet.....	1	Fibromata.	Supra-vag. amp.	Extraperit.	Recovered.
Gazetta degli Ospitali, May 12.....	P. A. Rakus.....	4	Fibromata.	Supra-vag. amp.	Extraperit.	Recovered.
Contrablat für Gynaecologie, March 23.....	Skean.....	2	Cerv. myoma.	Enucleation.	Uterine wound sutured.	Recovered.
La Presse Medicale, December 29.....	Terillon.....	1	Fibroid.	Supra-vag. amp.	Extraperit.	Recovered.
St. Louis Eclectic, April.....	H. Thoms.....	1	Multi. fibroids.	Supra-vag. amp.	Extraperit.	Recovered.
Journal de Med. de Bordeaux, April 15.....	C. W. Weger.....	17	Fibroid.	Supra-vag. amp.	Dropped.	2 deaths.
Boston Med. and Surg. Jour., Apr. 15.....	D. G. Wilson.....	1	Fibro-cyst.	Supra-vag. amp.	Extraperit.	Recovered.
Times and Recorder, October 12.....	.....	1	Fibroid.	Enucleation.	Drainage.	Recovered.
Medical Record, May 4.....	.....	1	Soft myoma.	Enucleation.	.....	Died from shock.
British Medical Journal, April 29.....	Tait.....	107	.....	.....	.....	9 deaths.

consists in careful arrest of hæmorrhage from the stump, excision of the mucous membrane of the cervix, suture of the raw surface toward the vagina, suture of the stumps of the broad ligaments to the sutured surface of the serosa uteri, fixation of the stump of the uterus at the lower angle of the abdominal wound, and careful closure of the latter. Drainage is strongly recommended.

Howard Kelly²⁷ recommends constriction of the pedicle by the elastic ligature, amputation of the tumor so as to leave a cupped surface to the stump, then a careful suture of the raw surfaces of the stump, leaving the ends of the sutures long; then suturing of the stump into the lower angle of the abdominal wound. In cases of hæmorrhage or oozing, the long suture-ends allow the stump to be easily brought into sight.

Price²⁸ advocates the dry extra-peritoneal treatment of the pedicle. After the clamp is applied, the stump is cut off and trimmed down so far as seems compatible with safety. The stump is then drawn down into the lower angle of the incision, and its peritoneal covering above and below the wire stitched to the abdominal peritoneum, two or three stitches being all that is required. This shuts out all possible chance of sepsis. A dry dressing of iodoform gauze is applied. Other antiseptic powdered substances, such as salicylic acid or subnitrate of bismuth, may be used if desired. In case of large, succulent stumps the bi-chloride may be directly applied. The result of this treatment is that the stump is completely mummified, and in a few days, varying according to the progressive tightening of the clamp, drops off without odor or discharge. The union of the incision is scarcely delayed. That absolute safety may be assured, it is of the greatest importance that a reliable wire be used. The daily tightening of the clamp keeps up a constant strain on the metal, while at the same time it brings the wire into a greater curvature. The metal must be therefore pliable but strong, and not ductile, as copper. To fill these conditions, he finds the "Delta metal" most suitable.

Treatment of Sloughing Fibroids. — Ely Van de Warker,²⁹ from the study of 5 cases of sloughing intra-uterine fibroids, states that the use of the curette to remove the sloughing periphery of an intra-uterine fibroid is justifiable when it is non-removable from any complication, or in case of extreme exhaustion that renders

extirpation extra hazardous; that the process of sloughing begins at the outer layers of the mass, and extends, layer by layer, into its deeper structure; that rapid dilatation of the cervical canal affords ample space for the manipulations of removal, and that slow methods of dilatation are unnecessary; that fibroids formerly intra-uterine, when extruded from the uterus, and pendulous in the cavity of the cervix, with the pedicle therein attached, are rarely found in a sloughing condition; that blanched mucous membranes in excessive blood loss due to intra-uterine fibroids afford a certain indication that the limits of safety have been reached in operative treatment, and that a doubtful prognosis must be given; that septicæmia with long-continued pyrexia is necessarily a fatal condition when due to a sloughing fibroid, unless relieved by the removal of the offending mass; removal, wholly or in part, is a life-saving operation, and is imperative; that the operation is comparatively easy and attended with but little danger, except in case of blanched mucous membrane.

Fränkel,⁹⁵ in speaking of sloughing fibroids, states that vaginal enucleation of a submucous myoma of the body of the uterus should be undertaken only when the operation can be completed in one sitting, and then only in favorable cases, where the cervix is already somewhat dilated. Large, solitary myomata of the cavity or wall, or where the cervix is rigid, are best removed by laparotomy or enucleation. Large myomata, partly delivered through the dilated cervix, are best removed by laparotomy, being best enucleated after loosening the elastic ligature about the cervix. The capsule left after enucleation makes the stump. This should be treated by the extra-peritoneal method, and should be made long enough, so that there is no dragging in the lower part of the wound. Submucous or intra-peritoneal myomata which have not yet been extruded into the vagina are best removed by the typical supra-vaginal amputation, after the complete closure of the abdominal cavity; the pedicle to be treated extra-peritoneally. Large myomata of the body, even with the cervix partly dilated, are removed in the same way, care being taken to allow a good pedicle, so that there may be as little traction as possible.

Hæmorrhage from Fibromata (see also *Endometritis*).—Max Runge,⁹⁵ after calling attention to the high mortality after operative measures for the removal of fibromata, describes his manner

of treating the concomitant hæmorrhages, noting 40 cases where he had achieved brilliant success. Using most careful antiseptic precautions in all the steps of the operation, he first, with the patient anæsthetized, makes a very thorough digital and instrumental examination to determine the size and condition of the tumor, the uterine cavity, and the uterine walls, noting particularly the thickness of all parts of the latter, because localized atrophy is very frequently present, and, if not recognized, would very probably lead to perforation during the thorough scraping of the cavity with the sharp curette which follows. After the curette a douche is given to remove *débris*, and then an injection is made with Braun's syringe of from 7 to 15 minims of the tincture of iodine, any excess being drawn back into the syringe or removed by another irrigation, which, however, may be difficult on account of the astringent action of the iodine. The patient is kept in bed and an ice-bag applied over supra-pubic region for twenty-four hours. If there are no unpleasant symptoms, the iodine application is repeated in from twenty-four to forty-eight hours, stopping the injection when pain is felt, but injecting enough to reach all parts of the cavity. Ice-bag as before. In a few cases severe pain results from the use of these large amounts of iodine, but usually there is no trouble. He has never had any symptoms of iodine poisoning. The hæmorrhage has always been stopped.

Kaltenbach⁷⁸⁸_{Jan. 10; Sept. 7} and Walton⁵²_{Mar. 2} speak most favorably of forcible dilatation sufficient to temporarily paralyze the cervical fibres, followed by curetting and removal of *débris*, both laying great stress on the beneficial results of the thorough dilatation.

CARCINOMATA AND SARCOMATA.

Early Diagnosis.—Impressed by the frequent complaints of patients in the New York Cancer Hospital that their attending physicians never told them that anything serious was the matter until their condition had become hopeless, and convinced that the general profession need to be impressed with the fact that the successful treatment of uterine cancer depends on its early recognition, Coe⁹_{Feb. 10} points out certain fallacies which are generally accepted, and calls attention to some reliable points in the early diagnosis of the disease. Over one-fifth of the recorded cases occur in patients under 40 years of age. The disease may reach an advanced

stage without producing cachexia. Patients may be very nearly free from pain, which, occurring later, may be due to peritonitis. Profuse, foul, watery discharge is not always present, even when there is extensive ulceration. Slight, irregular hæmorrhages, occurring *after coitus* or in the intermenstrual period, should attract attention, as they frequently result from incipient cancer. Any uterine hæmorrhages between 30 and 40 are usually pathological. In all cases in which a patient over 40 years of age seeks advice with symptoms referable to the pelvis, a careful examination should be made. Pain attending incipient epithelioma may be sharp or merely a dull backache, or a neuralgia of adjacent nerve-trunks, as the sciatic. Hypertrophy and general induration of the cervix, accompanying an erosion which bleeds easily when touched, should lead the physician to excise a generous wedge of the suspected tissue, including both the mucous membrane and the subjacent muscular tissue, and to subject this to microscopic examination. Excision of the cervix should be performed in every extensive case of erosion, whether cancer has actually developed or not. This is often sufficient to insure a cure, and thus render a radical operation unnecessary. A positive opinion regarding the presence of malignant disease is justified only by the finding of processes of atypical epithelium which *invade the subjacent muscular tissue*.

Other good papers on the same subject are by More-Madden,¹⁶ G. E. Shoemaker,⁸² H. Meyer,²¹⁴ R. B. Maury,⁷⁴ Landau and Abel,⁹⁵ and L. Landau.⁴⁰⁴ These all advocate substantially the views advanced by Coe.

Rare Cases.—A case of adeno-myxo-sarcoma is recorded by Mundé,²⁷ as occurring in a girl of 19. There had been marked cachexia and a profuse watery vaginal discharge for two years. There was a slimy, friable tumor filling and distending the vagina. This was removed by amputation of the cervix from which it sprang, but soon returned, and the patient died from exhaustion some months later. Diagnosis confirmed by microscopical examination, which also showed that the tumor was, in all probability, the result of a malignant degeneration of a mucous polyp. The condition is rare, only 8 other cases being recorded. The lesson to be learned from a study of the cases related in this paper is that, not knowing when a benign polypus or diffuse hyperplasia of the glands of the cervical cavity may take on the type of rapid

growth and the possible eventual malignant degeneration, it is well, as a precautionary measure, to remove all mucous polypi, however small, as soon as discovered, and to thoroughly destroy by curette and caustics all diseased glands in the cervical canal. As shown by the rarity of the cases, such malignant degeneration is, fortunately, not often to be apprehended.

Adeno-sarcoma with pyometra is reported by T. W. Kay.¹⁰⁴
Patient 52 years old. History of offensive discharge and pain eight months. On dilatation of the cervical canal, 20 ounces (591 cubic centimetres) of offensive pus flowed out, and the sarcomatous growth was found on the posterior wall. Diagnosis was confirmed by the microscope. Sarcoma of the internal genitals in a girl 14½ years old is noted by Guttman.⁹⁹
Apr. 11

Treatment (Medical).—J. E. Burton²²
Sept. 25 strongly advocates the topical application of turpentine as a palliative agent for the suppression of the fetid discharge of uterine cancer. He mixes a teaspoonful of the turpentine with a pint of water. This is then thoroughly mixed by pumping up, with a Davidson syringe, 3 or 4 syringefuls of the water and working it back into the containing vessel. By this means the particles of turpentine are minutely divided and dispersed through the whole of the water, so that there will be time to inject the liquid before separation again takes place. Used in this way, turpentine is painless, economical, easily applied. Administered three times a day, offensive odors are easily prevented. Burton also recommends Chian turpentine, which has in our hands also proved an excellent palliative, diminishing pain, hæmorrhages, and partly inhibiting the growth of cancer. Antipyrin is highly recommended for subduing the pains of cancer by Marquis.²
Sept. 21 Hot-water vaginal injections are said by Tornery²⁶
Oct. 1 to be most beneficial. The water should be at the temperature of 40° C. (104° F.), and used twice daily for about half an hour. It lessens the discharges, diminishes hæmorrhage, relieves the pain, and improves the general condition.

Treatment (Electrical).—Inglis Parsons's²
Apr. 1907 views as to the action of galvanism are that, while the normal tissues of the body have the power of recuperating from any effect produced on them by the transport of elements, the cells of tumors, being of lower vitality, might be checked in their growth and perhaps in time destroyed. He details experiments going to show that the constant

current exerts no decomposition in the interpolar region, but when the current is suddenly interrupted marked signs of disturbance follow, which he attributes to some destruction of tissue. If this be true, he believes that the correct method of curing cancer is found. The impact of a powerful current suddenly flashed through causes such injury of the tumor-cells, in or near its path, as leads to their gradual atrophy. In treating fibroids, the danger of sloughing leads to the avoidance of interruptions of the current, but in cancer the free supply of nutrient vessels renders this precaution unnecessary. The operation is as follows: The patient is anæsthetized; the current is then passed through the tumor and all the tissues for some inches around it by means of fine insulated needles, so as not to injure the skin. The battery is of 70 cells, with an electro-motive force of 105 volts; the intensity of the current to commence with is 10 milliampères, gradually increased to 600 milliampères, and flashed through the growth in every direction from 50 to 100 times, according to circumstances. The pulse and respiration are carefully watched. Several cases are recorded where alleviation of pain, shrinking and hardening of the tumor, and improved health followed the treatment. The growths were probably reduced to fibrous tissue. The advantages of this method of treatment are: There is no destruction of the normal tissues of the body, and, if recurrence should happen, it may be stopped by a repetition of the treatment. So far, cases able to bear the full strength of the current have had no recurrence. Patients are not kept in bed. The method can be used in parts beyond reach of the knife, and appears full of promise, even if it proves to be only palliative.

Caustics.—Braithwaite² speaks most favorably of the use of zinc chloride. He uses a saturated solution, applied by means of a thin layer of cotton-wool wetted with the zinc solution, and lightly pressed between two pieces of blotting-paper. It should be left in contact with the parts for twenty-four hours or longer, healthy tissue being protected by cotton impregnated with soda. Its use is followed by great contraction of the parts, which, however, is usually not disadvantageous.

A. Reeves Jackson¹⁸¹ prefers, in place of more serious operation, the vigorous use of the sharp curette, followed by the use of a 50-per-cent. solution of the zinc chloride. The senior editor of this department has for many years practiced and taught this

method, and, in his opinion, it removes a deeper and more satisfactory eschar than does the actual cautery, and enables us to go beyond the safe reach of either the knife, scissors, or curette.

John Byrne,⁹⁹ from favorable personal experience, strongly advocates the use of the galvano-cautery. He has operated on 367 cases of uterine cancer, and the average period of exemption in cases which could be kept under observation was 8 years and 7 months. His usual method is to remove the cervix as completely as possible by the galvano-caustic loop, then to thoroughly cauterize the mucous membrane of the uterus by an instrument passed into the uterine cavity, and the final thorough recauterization of the cervical stump. The parts must be quite dry before the cautery is used. Moisture must be repeatedly wiped away, and the cautery re-applied until all the tissues within reach are thoroughly seared. The deeper-lying cancer-cells are destroyed by less heat than will injure normal tissue. No medication is usually needed, except, after a few days, cleansing douches.

High Amputation.—Landau and Abel,⁹⁵ believe that in cases of cancer of the cervix the corporeal endometrium nearly always undergoes marked changes of a malignant character. The histological structure of the diseased endometrium is often identical with that of round-cell sarcoma, which is to be regarded as the initial stage of cancer metastasis. The lesson they derive from this is that, in a given case of cancer of the cervix uteri, the surgeon must be entirely ignorant of the true condition of the corporeal endometrium, and ought not to be satisfied with high amputation, but should remove the entire organ. This opinion is in accord with the majority of German authors, but is qualified by Coe,⁵ opposed by Verneuil,⁴⁸ Williams,¹⁰⁶² and Duchamp,²¹¹ who all agree that cancer of the cervix tends to spread laterally rather than to pass up the uterus, and to recur in the tissues around the uterus after amputation of the cervix rather than in the uterine stump. Infected glands lie in the connective tissue near the broad ligaments. In total extirpation, the uterus is cleanly dissected from its surroundings, hence these glands are certainly left behind. Some of the good results following the destruction of cervical cancer by caustics, with or without the knife or écraseur, seem to depend on the extension of the destructive agent laterally, so as to involve the infected glands and pelvic connective tissue. In cases of this kind the upper part of

the uterus is probably still free from any trace of cancerous infection when the cauterization is carried out. Evidence tends to prove that the infection of uterine tissue occurs late in cancer of the cervix. On these principles, Duchamp bases his practice in cases of cancer of the cervix. He begins by dissecting away the anterior part of the cervix from the bladder until the level of the utero-vesical fold of peritoneum is reached. Then he cuts through the cervix at that level. Should the cut surface or the exposed canal prove to be free from cancer, he completes the operation as a supra-vaginal amputation of the cervix. Should there be cancerous growths on the exposed parts, he extirpates the uterus through the vagina.

More-Madden¹⁶ is a strong advocate of high amputation, partly on account of the reasons mentioned above and partly because of the slight primary mortality and the equal immunity from recurrence as compared with total hysterectomy. In operating, he favors the infra-vaginal method and the use of the wire *écraseur*, which has given good results in his hands. Coppens reports a case, and warns against the danger of opening the *cul-de-sac* while using the *écraseur*. He would guard against this accident by first incising the mucosa around the cervix and then applying the wire.

J. B. Hunter,⁵⁹ Jacobs,²⁷⁶ Boerner,⁸⁴ Liebmann,⁸¹⁷ Cushing,⁹⁹ Byford,⁵⁹ and Kufferath²⁷⁶ have each reviewed the literature and statistics of *vaginal hysterectomy*, and are unanimous in its favor. The primary mortality continues steadily to decrease and the ultimate results to improve. This is to be attributed both to improved technique and to operation at an earlier stage of the disease. Recent statistics make the average mortality less than 10 per cent., though certain operators, as Rubeska,⁶¹ (28 cases, no death), Kaltenbach,⁴ (30 cases, 1 death), Muenchmeyer⁹⁵ (80 cases, 4 deaths), have obtained even more brilliant results. Kaltenbach believes even these results will be exceeded, and would extend the indications for the operation. He considers that the mortality in skilled hands is so slight that operation is proper, even if we cannot hope for radical cure. He attributes his favorable results to careful asepsis and careful closure of the peritoneum by suture. Exuberant masses are removed by the curette and the surface touched with a caustic. Before operation the vagina is irrigated with bichloride, 1 to 1000; during operation, irrigation with

1 to 300 salicylic-acid solution only when there is purulent secretion. After the closure of the peritoneum the vagina is washed with the bichloride. If the vulva closes well, no vaginal dressing; otherwise, loose salicylic gauze. Gauze removed in eight days. Sutures and ligatures removed after the sixteenth day. No irrigation for two weeks. In Rubeska's cases no exceptional mode of operation was employed, except that the stumps of the ligaments were drawn well into the vagina and stitched to its walls. This is

VAGINAL HYSTERECTOMY FOR CANCER.

Where Reported.	Operator.	No. Cases	Method.	Immed. Result.	Remarks.
Northwestern Lancet, February 15 . . .	E. J. Abbott . . .	1	Forcepress.	R.	
Wiener Klinische Wochenschr., April 4 . .	E. Börner . . .	1	Ligature.	R.	
Liverpool Medico-Chirurg. Jour., July . .	J. E. Burton . . .	1	Forcepress.	R.	
Boston Med. and Surg. Journal, May 16 . .	Cushing . . .	5	Forcepress.	R.	
Wiener Medicinische Presse, June 23 . . .	Felsenreich . . .	1	Ligature.	R.	
Gaceta Médica de México, Dec. 15, '88 . .	Fénelon . . .	4	Forcepress.	3 D.	Recurrence* Shock.†
Montreal Medical Journal, February . . .	Wm. Gardner . .	1	Forcepress.	R.	Aged 24 yrs.
Canadian Practitioner, July . . .	Groves . . .	1	Ligature.	1 D.	Laparot'y.‡
Kansas City Medical Record, October . . .	G. Halley . . .	3	Forcepress.	2 D.	Shock.
New York Medical Record, February 19 . .	J. B. Hunter . . .	11	Forcepress.	R.	Acute neph.§
Journ. Amer. Med. Association, May 25 . .	J. T. Johnson . .	1	Forcepress.	1 D.	||
Berliner Klinische Wochenschr., May 6 . .	Kaltenbach . . .	30	Ligature.	1 D.	¶
Centralblatt für Gynäkologie . . .	Keller . . .	1	Forcepress.	1 D.	¶
Amer. Jour. of the Med. Sciences, June . .	Kümmel . . .	8	Forcepress.	3 D.	¶
Deutsche Medizinische Zeitung, July 15 . .	L. Landau . . .	20	Ligature.	1 D.	¶
New Orleans Med. and Surg. Jour., May . .	G. B. Lawrason . .	2	Forcepress.	1 D.	¶
Lyon Médical, April 21 . . .	Leriche . . .	1	Forcepress.	1 D.	¶
Pacific Medical Journal, October . . .	McNutt . . .	1	Forcepress.	1 D.	Tetanus.††
Amer. Jour. of Obstetrics, November . . .	E. E. Montgomery .	3	Ligature.	4 D.	62 still alive.
Archiv für Gynäkologie, p. 527.	Münchmeyer . . .	80	Forcepress.	R.	
Bulletin Médical du Nord, Dec. '88 . . .	Paquet . . .	2	Forcepress.	R.	
University Medical Magazine, April . . .	Roberts . . .	1	Forcepress.	R.	
Jour. de Méd. et de Chir., Brux., Mar. 20 .	Rouffart . . .	5	Forcepress.	1 D.	Laparot'y.‡‡
Jour. Amer. Med. Association, June 8 . . .	Rubeska . . .	27	Ligature.	R.	
Sei-I-Kwai Medical Journal, September . .	S. Satow . . .	1	Ligature.	R.	
Maryland Med. Journal, June 8 . . .	J. H. Scarff . . .	1	Forcepress.	R.	
Centralblatt für Gynäkologie, Dec. 15, '88 .	C. H. Stratz . . .	1	Ligature.	R.	
Amer. Jour. of Obstet., June and August .	G. V. Tuttle . . .	2	Forcepress.	R.	
Medical Register, December 15, '88 . . .	Wathen . . .	1	Forcepress.	R.	
Maryland Med. Journal, January 12 . . .	R. Winslow . . .	1	Mixed.	R.	Ligature.§§
		227		18 D.	

* After three months.

† Rupt. of abscess in preces. hæmorrhage.

‡ At same time for rem. ovarian cyst.

§ Hæmorrhage from clamp.

|| Cases from May, 1888, to April, 1890.

¶ Only 3 lived over twelve months after op.

†† 8 free from rec. from two to thirty-two moa.

‡‡ On fourteenth day. Patient played with dog.

§§ Necessary in 1 case to finish operation. Recov.

¶¶ And clamps.

done that any possible recurrence will be within the range of observation and subsequent treatment.

The late J. B. Hunter⁵⁰ says, in favor of the use of the forceps, that they save time, are easier of application than the ligature, make more firm and permanent compression, and favor drainage. There is less danger of injuring the ureters, more traction on the tissues is required in applying the ligature than in applying the forceps, and, to the inexperienced operator, they offer a much better prospect of success, as less skill is necessary for their application. The *modus operandi* most often followed (Hunter,⁵⁰

Cushing,⁹⁰_{May 16}) is to open the posterior *cul-de-sac*, stitch the peritoneum to the vaginal wall, open the anterior *cul-de-sac*, separate the bladder, divide the mucous membrane about the cervix, apply the forceps in such a manner as to include only the uterine artery. The tissue included is then cut close to the uterus, and the second forceps applied higher and made to include the remainder of the broad ligament and the ovarian artery. The same process is then repeated on the opposite side. Every bleeding point is to be seized with forceps, some of which may be removed when the operation is complete. The four forceps guarding the important vessels should all be secured by tying the handles after they are properly applied. If at any stage of the operation the ovaries or tubes are seen, it is better to remove them, using a silk ligature, or, if practicable, a light forceps. The vagina is then lightly packed around and between the forceps with iodoform gauze; the projecting handles are enveloped in a mass of cotton, so supported that they cannot drag or cause pain. The forceps are removed after thirty-six hours; those which are applied to the large vessels, being tied, can be distinguished from the others and can be removed last. As the instruments give some annoyance by their weight and bulk, those which are attached to the less important points may be removed at the end of twenty-four hours. No force is necessary, as they usually come away almost of themselves as soon as they are unclapsed. When the forceps are removed there is generally some discharge, and the gauze is often saturated with a serous, odorless fluid. It will be found practically that the margins of the peritoneum fall together of themselves and close the opening. No injection should be used at this time; no speculum introduced or vaginal examination made without some special reason. During the first week a light tampon of gauze is introduced once a day to give support to the vagina and to secure drainage.

There certainly seems to be greater danger of intestinal adhesion to the raw surfaces after the clamp operation than after the operation by the ligature, where the stumps are sutured to the vaginal opening, several cases being reported where this adhesion has occurred and has occasioned serious trouble or death. Stratz,⁸¹⁷_{Dec. 16, '98} proposes to avoid this danger in the operation by ligature by occluding the peritoneal cavity by means of a peritoneal flap taken from the anterior peritoneal fold.

New methods of performing hysterectomy have been devised by Kraske and by Zuckerkandl; they both seem rather formidable, and certainly can be applicable only to very exceptional cases.

Zuckerkandl's method ¹¹⁸_{Mar. 24} is by means of a convex incision across the perinæum from one tuber ischii to the other, the convexity looking toward the vulva. The perineal muscles are cut through, and the portions of the levator ani coming from the pubes divided, so that the rectum can be drawn backward. Further division of the tissues of the recto-vaginal septum is made with the knife-handle until Douglas's pouch is exposed and incised. The wound is then enlarged to admit the hand, when a good view of the uterus and its surroundings is obtained. The uterus is then turned back and drawn out with its appendages. Transverse section of the peritoneum above the bladder is made, further separation being accomplished without the knife to avoid injury to the ureters. Ligation of the broad ligaments is said to be easily accomplished with the aid of both touch and sight. The stumps of the broad ligaments may be returned to the cavity, the peritoneal wound being closed by sutures or they may be stitched into the vaginal wound. The advantages claimed are: Easier access on account of the greater space in which the operation is done, the possibility of seeing as well as feeling the condition of the uterus and adnexa, and that extirpation can be more completely accomplished than *per vaginam*. Zuckerkandl has not done the operation, but a successful case operated on by his method is reported by Frommel, ³⁴_{July 28}, the only modification being a previous partial separation of the bladder by an incision through the anterior vaginal *cul-de-sac*. Frommel considers the operative technique more difficult than vaginal hysterectomy, but thinks the method has a future.

Kraske's sacral method of operation for removal of any of the lower pelvic structures is described by Julius Hochenegg. ⁸_{Feb. 28} The operation consists, first, in the enucleation of the coccyx and resection of one sacral wing (the left for operations on the rectum, the right for other pelvic structures) to the third foramen, the skin incision being somewhat concave toward the side chosen. The rectum, being exposed in the bottom of the wound, is pushed to one side, when the peritoneum appears and is opened by a broad incision. A thorough digital and visual examination is then made of the diseased structures, which, it is claimed, can in no other way be

so easily and perfectly placed under command of the eye and hand. The method is indicated in low, adherent pelvic or intra-ligamentous tumors of small size, for carcinoma with adhesions, removal of carcinomatous glands, and diseased conditions of the uterus and adnexa which do not admit of treatment by other operative procedures. The advantages claimed are the facilities for the complete and certain arrest of hæmorrhage, the ample drainage afforded, and the possibility of removing the diseased structures under the control of the eye, thus allowing the preservation of any parts not involved. The same paper gives the report of 2 cases where Kraske's method was successfully employed. In the first, Gersuny, failing by the ordinary method of vaginal hysterectomy to remove a carcinomatous uterus, resected the right sacral wing to the foramen, extirpated several carcinomatous glands, opened the peritoneum in the middle line, easily ligated and severed the broad ligaments and bladder, then cut about the cervix, and finished the operation *per vaginam*. The vaginal wound was closed by partial peritoneal suture and a loose plug of iodoform gauze. The sacral wound was stitched. There was a slow convalescence, with considerable fever for two weeks. The sacral wound healed by granulation, and the patient was discharged in six weeks.

The second case was one of the removal of a small cystic tumor from the left parametrium, together with the supra-vaginal amputation of the uterus. Operation as before. The tumor was enucleated slowly and with difficulty on account of its close anatomical connection with the surrounding parts. Convalescence with fever and granulation of sacral wound. Patient discharged in twelve weeks with a sacral fæcal fistula. Under the conditions it would have been impossible to have removed the parts by any other operation. Hegar reports a third case where the operation was successfully done, the wound healing by granulation, and convalescence being slow, as in the other two. Roux records 4 successful cases operated on without sacral resection for removal of carcinomatous uteri, all of which recovered.

The mortality after *abdominal operations* for carcinoma is so very great that it is only done as the last resort, as in 2 successful cases reported by Terrillon and Largeau,²⁴ or when the cancer is complicated by pregnancy, as in a successful case by Zweifel,³¹⁷ who states that 6 other cases which he found recorded

were all fatal. Since the appearance of his paper, however, 3 successful cases have been reported by Ruggi,⁵⁰⁵_{May 12} and 1 by Goodell,⁹_{Mar. 20} who saved both mother and child. A case operated on by Halley¹⁰²_{Oct.} died from shock.

Vaginal Hysterectomy for Retained Placenta.—After an abortion at the sixth month the placenta could not be removed by the midwife in charge, and became septic. Roosenburg⁵⁷_{Nov. 2} made several attempts at removal, but failed. The woman was then almost moribund, and, as a forlorn hope, vaginal hysterectomy was done. The patient immediately improved and finally recovered. The placenta was found to be very strongly adherent. The case is believed to be unique, as in the only other cases recorded the uterus has been removed by supra-vaginal extirpation.

DISEASES OF THE PERITONEUM.

Ceccherelli,⁴¹_{June 20} reports 3 cases of laparotomy for tuberculous peritonitis, followed by marked improvement, and reviews the literature of the subject. In 85 cases which he had collected, 52 resulted in permanent cure, 6 were improved, 7 died immediately after the operation and 15 of the disease subsequently, and 5 passed out of observation. Other successful cases are noted by Werner,²³_{May} Deneke,⁶⁰_{Apr. 11} and Schmidt.³¹⁷_{Aug. 10} Alban Doran,⁶_{June 12} recently performed a laparotomy for a supposed case of tubercular peritonitis. The peritoneum was found to be very thick, and intimately adherent to a firm, spongy substance that lay beneath it, and oozed freely on section. Suspecting that the disease might be ovarian sarcoma the operator closed the wound. The patient made a good recovery, the swelling slowly diminished, and after a year all traces of the tumor disappeared. The case is believed to be one of anterior serous perimetritis.

PELVIC CONNECTIVE TISSUE.

Parametritis and Pelvic Abscess.—After most careful investigation, Bumm,¹¹³_{June 22} concludes that these inflammations are due always to infection, even in cases where the effusion becomes absorbed, as staphylo- and strepto- cocci are always found in the exudate, but are not present in the healthy organism. Shimonek,¹⁰⁵_{Feb. 1} states that the infection is carried by the lymphatics and veins. Remembering the distribution of the connective tissue around the uterus, we

can well understand that when the microbes enter an injured lymph-vessel in the cervix (Allen⁴⁰_{Sept.}), where the majority of dangerous infections occur, they can easily pass to the iliac and sacral lymph-glands, cause a specific adenitis and the formation of even a true pelvic abscess. Entering the veins simultaneously they may induce a general septicæmia. The presence of inflammation or of pus in the pelvic cellular tissue alone is rare as compared with cases accompanied or stimulated by tubal disease (see Disease of the Fallopian Tubes); and it may be quite safely asserted that the so-called "chronic pelvic cellulitis" never occurs (Hardon²⁰⁷_{Feb.} and Parish,⁹_{June 29}) except as the sequel of an acute pelvic cellulitis. Nearly all of the many papers (Skene,¹⁵⁷_{Jan.} McLaren,¹⁰⁵_{Feb. 1} Clinton Cushing,¹⁷⁰_{Feb.} E. W. Cushing,²³_{Mar.} Parish,⁹_{June 29} Wiedow,⁹_{Aug. 21} Baumgärtner,⁴_{Aug. 21} Price,¹³⁷_{Nov.} Ashby,¹⁰⁴_{Nov. 21}) on the subject substantially agree in regard to the points just mentioned, and all favor the early evacuation of pus by incision *per vaginam* or *by laparotomy* and drainage; the choice of the method being governed by the conditions present in the cases laparotomy being always favored when there is a probability that the appendages are involved in the trouble.

Nilsen⁵⁹_{Mar. 5} reports favorable results from the use of the aspirator followed by washing out of the abscess-cavity, and he believes that in the hands of the general practitioner or the timid operator it is safer than the knife, and in many cases will result in cure. Aust-Lawrence²_{Nov. 19} has noted rapid absorption of hard inflammatory exudates after puncture by the needle, even when no pus or serum was drawn off, and mentions similar cases recorded by Horrocks.²_{Oct. 19}

Bröse⁶⁹_{June 19; Aug. 24}¹ and Orthmann⁴_{Nov. 21, 22}⁶¹_{Aug. 21} report only moderately favorable results from the employment of galvanism (50 to 100 milliampères, negative or positive, in vagina) in chronic parametric cases. Their results were a trifle more favorable in cases of more recent exudations.

Pelvic Hæmatocele (see also *Ectopic Gestation*, Section G, vol. ii).—Comparative merits of abdominal section and vaginal incision in the treatment of this condition are ably discussed by Rosenwasser,²³_{Sept.} who decides emphatically in favor of the former, saying that, when surgical interference is required in case of extra-peritoneal hæmatocele, laparotomy is as much an advance over vaginal incision as was the latter an improvement over puncture. The mortality after laparotomy is 9.09 per cent.; after vaginal incision,

about 10.5 per cent. With laparotomy, the danger is less; the chance of radical cure and shorter convalescence is greater; the chance is afforded of simultaneously removing other diseased conditions; hæmorrhage is more easily and completely controlled; and the sac is more easily kept aseptic.

DISORDERS OF MENSTRUATION.

It has been stated that the function of menstruation has been developed in women as a result of civilization, but it seems more reasonable (Currier²) to consider it as a higher type of a function associated with the reproductive system and observed in almost every variety of animals. Thus, the females of certain insects exhibit decided changes of color during the breeding season; in reptiles and fishes, the period in which the eggs are deposited is marked by nervous excitement and hyperæmia of the orifices of the generative canal; tortoises exhale an odor of musk, and lizards and snakes secrete an odorous, fatty liquid when the sexual appetite is aroused. Ascending the scale, we find that the sexual appetite is aroused with a more marked periodicity, and is accompanied by more or less discharge from the genital passages, in which the sanguineous element increases the higher we ascend in the scale of animal life. In certain of the domestic animals a sanguineo-mucous discharge recurs with almost as much regularity as in women. With animals having hollow uteri the external hæmorrhage is less profuse than in those in which the uterus is thick and nearly solid; so that, while the transudation into the uteri of bitches, sows, and cats may be quite abundant, the external hæmorrhage is quite insignificant. In the anthropoid apes, in which the uterus quite closely resembles that of the human female, the external hæmorrhage is quite similar to that of women. It would therefore seem proper to conclude that menstruation does not originate in civilization, but in a physical law of very general application; that, normally, it implies a flow of blood by way of the genitals, unaccompanied with pain, sufficient to relieve congestion, but not enough to cause weakness or exhaustion.

Amenorrhœa.—In cases where advice or treatment is required for the delayed primary appearance of the menses, it is always well, if medical treatment is not successful after a reasonable time, to insist on the necessity for a vaginal examination to enable us to

detect any abnormal condition of the genital organs, as imperforate hymen or the rarer condition of absence or faulty development of a part or the whole of the internal genitals. Kakushkin¹⁰⁹ records a case of total absence of the vagina, uterus, and appendages in a married woman who came to him for the relief of amenorrhœa, sterility, and dyspareunia. We have recently seen two such cases at the New York Polyclinic, where the misfortune of marriage would have been avoided had a vaginal examination been attempted previously by the patients' physicians. Fuertes also reports a similar case. In cases where a rudimentary uterus is present, it is sometimes advisable to construct an artificial vagina, but where the internal genitals are entirely absent such an attempt is usually unsatisfactory or a complete failure.

The less rare condition of secondary atrophy with amenorrhœa may often be satisfactorily treated by faradism and massage (Heitzmann¹⁰⁰). The prognosis is greatly dependent on the condition of the ovaries, and is practically hopeless if they are atrophied.

Lutaud⁸⁵ notes 18 cases where the morphia habit caused amenorrhœa. This amenorrhœa is complete and accompanied by loss of sexual desire, but the functions are re-established if the habit be broken. Inglott² and Collins² each record cases of amenorrhœa cured by severe physical shock or fright. Duke⁶ recommends, in cases where ordinary treatment has failed, the wearing of a spiral-wire intra-uterine stem; this is flexible and light, with a broad, expanded base, which is embraced by the vaginal walls and holds it in place. He records very satisfactory results.

Segur⁵⁹ finds that the agents most generally used for the relief of amenorrhœa are general tonics, iron, arsenic, and cod-liver oil. Of the manganese compounds, the binoxide seems to give the best general results, though, like all medicinal agents, it cannot always be relied on. The lactate of manganese is also an efficient and unirritating preparation. The dose of all the manganese compounds is 2 grains (13 centigrammes), t. i. d., after food. Davies²⁸ strongly favors a combination of caulyphyllin and pulsatilla.

Dysmenorrhœa.—Segur⁵⁹ finds that the most commonly used agents are pulsatilla, cannabis, viburnum, camphor, belladonna, antipyrin and manganese. Pulsatilla is particularly praised by Bovet¹⁴ used in the form of a tincture of the fresh leaves, 10 minims three or four times a day.

Jordan⁵⁷_{Sept. 15} favors fluid extract of hydrastis, especially in membranous dysmenorrhœa, claiming several cures from the agent. Farlow⁹⁹_{May 22} employs rectal suppositories containing $\frac{1}{4}$ grain each of extract of belladonna and extract of cannabis, one at night, and, if necessary, one in the morning also. If this is not tolerated, smaller doses are given. This combination is also useful for various pelvic pains, ovarian congestion, etc. Lewis¹⁸⁸_{July} employs conium or salix nigra. Goubet⁵⁸_{Jan. 5} speaks highly of iodoformized asafœtida, as follows:—

R Iodoformi, gr. ss (0.032 gramme).
 Extr. bellad., gr. $\frac{1}{4}$ (0.010 gramme).
 Asafœtidæ, gr. iss (0.097 gramme).

M. ft. pil. no. j.

Sig. : Take six times daily for a week before menstruation.

Huchard⁸⁵_{Jan. 24} warns against the use of antipyrin, claiming that it stops the flow. The symptoms in his case, however, seem to be due to an overdose, and would not contra-indicate the careful use of the remedy which certainly has given us good results. O'Donovan,⁹_{Apr. 5} Scott,⁹_{May 11} and Stephenson⁴³_{Aug.} all report very favorable results from the use of the manganese compounds in dysmenorrhœa and other conditions accompanied by pelvic pain.

Rapid dilatation, which we consider the most satisfactory means for relieving dysmenorrhœa associated with flexions, contracture, or hyperæsthesia of the uterine canal, is favorably discussed in papers by Sweetnam³⁹_{Feb. 15} and Alloway.²³²_{Mar.}

Orthmann⁴_{Nov. 21, 22} and Bröse⁶¹_{Aug. 21} and Bröse⁶⁰_{June 15} report very satisfactory results in the treatment of obstinate and severe dysmenorrhœa by the use of galvanism, with the negative pole in the uterus, a current of from 30 to 75 milliampères, and two applications per week.

Menorrhagia and Metrorrhagia (see also *Endometritis* and *Fibroids*).—Henske⁵¹⁴_{Mar.} has published a very good paper on this subject, in which he advocates as palliative measures rest in the horizontal position, quietness, hot (120° F.) douching, and opium. If the hæmorrhage is due to subinvolution after abortion, etc., or to hyperplastic endometritis, he employs the sharp curette. After thorough curetting he applies pure carbolic acid to the raw surfaces, followed by hot douching.

Among medicinal agents, Taylor¹¹²_{Feb.} places, first, fluid extract of ergot in doses of from $\frac{1}{4}$ to 1 fluidrachm (1.8 to 3.7 cubic centi-

metres); next, oil of erigeron in 5-minim capsules every three or four hours; gallic acid, digitalis to the point of toxic effect, aromatic sulphuric acid, turpentine, and tincture of cinnamon. Rokitsansky¹⁰⁸ finds the following very efficient:—

R Extracti ergotæ, ʒiss (5.54 grammes).
 Acidi salicylici, gr. viij (0.5 gramme).
 Aq. cinnamomi, f ʒvj (177.8 grammes.)
 Syr. cort. aurant. amar.,
 Spiritus juniperi, āā ʒss (14.79 gramme).
 M. Sig.: Dose, 1 teaspoonful three times a day.

Williams¹⁰⁴ finds strophanthus of value in cases of marked anæmia and debility. Dose, 6 minims of the tincture every six hours.

Fetid Menstruation.—This condition of extreme fœtor differs markedly from the natural, more or less pungent, fishy odor of normal menstruation, and may be caused by systemic dyscrasias associated with degenerated blood conditions, as chlorosis, syphilis, etc., or by abnormal retention and decomposition of the catamenia. Many severe cases are due to endometrial disease or to the gonorrhœal poison. Relief of any blood dyscrasia present and of the accompanying endometritis are indicated. Besides these measures, antiseptic and deodorizing irrigation is useful (DeWees⁶¹).

Vicarious Menstruation.—A fatal case has been reported by Holmes⁹⁹ where the cause of death was intestinal hæmorrhage. There was no autopsy, however, and the case does not seem well substantiated. Two cases are reported by DeSaussure Ford²⁷ and 1 by McVickery.⁹⁹ Waugh⁶² records a rare and interesting case where, in a girl of 14, blood appeared each month in drops like perspiration upon her forehead. Her menses had not yet appeared. He diagnosed the case as one of vicarious menstruation in the form of stigmata, calls attention to the fact that such cases are usually in patients of very emotional temperament, and instances the famous case of Louise Lateau, who had stigmata on her brow, hands, and feet, which were supposed to be the result of a miracle. The condition is a purely nervous one, and calls for the persistent use of mild remedies to stimulate the pelvic organs.

Induced Amenorrhœa.—Suppression of menstruation as a therapeutic agent has been strongly advocated by Gehrung²⁷ and Reeves Jackson⁹ in all cases in which a saving of blood seems an important indication. Gehrung has found the treatment particu-

larly valuable in cases of anæmia and chlorosis, and Jackson speaks especially of the benefit in bleeding myomata. Neither have ever seen any unpleasant results from the treatment. The result is obtained by a careful and thorough tamponade of the vagina with small pledgets of damp cotton. In twenty-four hours, if the packing is stained, it is removed and fresh cotton inserted; otherwise, it remains forty-eight hours. One packing may be enough or it may need to be repeated five or six times. There is no danger of effecting any permanent suppression of menstrual function.

Habitual menstrual peritonitis, according to Duclos,⁸⁵ is ordinarily unilateral, and is caused by retro-uterine hæmatocele. It usually ends in resolution, but may suppurate. It is to be regarded as a contra-indication to marriage on account of the effect of sexual stimulation or possible pregnancy.

The Menopause in Some of its Relations to Disease is the title of a paper by the late Jas. B. Hunter.⁸⁶ He urges that greater, and not less, attention should be given to all nervous and other symptoms, which are too often ascribed simply to hysteria. Melancholia, profound depression, and the disposition to exaggerate the every-day cares of life should be watched with care and sympathy, especially if there is any trace of insanity in the family history. The morbid dread of cancer, from which so many women suffer all their lives, is particularly active at this period, and the subjective uterine symptoms often give some ground for apprehension. Such fears can best be allayed by making sure that there is no real cause for alarm.

Pain is not commonly a prominent feature in the disorders of the menopause, but in cases of previous pelvic peritonitis, with adhesions, very severe pain is often experienced during the congestive period. Pain from this cause may be expected to disappear when the menopause is fully established.

He earnestly insists on the necessity for careful and immediate vaginal examination of every patient who, at this time, comes to us complaining of profuse menstruation, hæmorrhages, or vaginal fluxes; for, while the early recognition of malignant degeneration is at all times of the utmost importance in regard to treatment, it is especially so at the period when the menstrual life is drawing to a close, when the dangers of malignancy are aggravated, and when the rate of growth of all forms of cancer is enormously increased.

DISEASES OF THE OVARIES AND TUBES.

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AND

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OVARIAN TUMORS.

Ovarian Cysts.—Rutherford²¹⁸ states that cystic disease of the ovary is recognized as occurring under this form, namely: 1. The multilocular cystoma, or cystoma proliferans glandulare. 2. Dropsy of the Graafian follicles, or hydrops follicularis. 3. Rokitansky's tumor. 4. Wolffian cysts, i.e., cysts originating in the vestiges of the Wolffian bodies, which are found normally in the hilum of the ovary (Olshausen, Coblentz, Doran), to which must be added, for the sake of completeness, dermoid cystoma and cysts originating in degeneration of the corpora lutea (Cruveilhier, Rokitansky, Bland Sutton). The existence of unilocular cysts of the ovary has been hotly contested, doubtless most of the tumors included under that heading in the earlier histories of ovarian tumors being parovarian. If from the anatomical relations of the cyst we should discover that it sprang from, and practically consisted of, the distended ovary, and if there was an uninvaded condition of the broad ligament, with its contained parovarium; further, the presence of Graafian follicles in sections from various parts of the cyst-wall, or, on failure to find these, the presence of minute vesicles lined by a very regular epithelium of a low, cubical type would prove with almost absolute certainty that it was of ovarian origin. Rutherford²¹⁸ presented a cyst with these conditions, which was interesting not only from its being unilocular, but also from the low specific gravity of its contents (1015). Rutherford says that, as regards this last point, while it is true that, as a rule, greater densities than this are characteristic of the multilocular cystoma and the lower order of simple cystic formations, either in the ovary or in the broad ligament, it is pointed out by

Olshausen¹⁰⁴² that great variations occur in the multilocular tumor in the contents of the various loculi, and that in general the largest cavities contain the thinnest fluid. In 15 cases he found the specific gravity to vary between 1005 and 1022. On the other hand, Tait¹⁰⁸⁹ says that he has removed many parovarian cysts which contained thick, gelatinous, grumous, or bloody fluid, which mere tapping would never have led us to suppose had been produced in any other cavity than that of an ovarian cystoma.

In *Wolffian cysts* it would seem, from the researches of Olshausen,¹⁰⁴² Fischel,⁹⁵ and Doran,¹⁰⁴⁰ that the only points which can be taken as pathognomonic of such origin is the presence either of ciliated epithelium or of distinctly papillomatous intra-cystic growths. A further, though less weighty, consideration unfavorable to this view exists in the fact that microscopic examination has already demonstrated a different pathological process in adjoining parts of the same tumor.

As the result of *follicular dropsy*, Olshausen²¹³ maintains the existence of unilocular tumors of large size, and, from a gross and histological examination of specimens, and in support of this view, quotes the evidence of Peaslee and Spencer Wells to the effect that the growth of such cysts is only limited by the distensibility of the abdominal wall. Rutherford says that Olshausen's own observations do not suffice to exclude the possibility that he was dealing with Wolffian cysts of the ovary, in which, while the ciliated character of the epithelium had disappeared, no papillomatous growths had occurred, although the existence of large Wolffian cysts without papillary formations at some part of their wall rests rather on clinical than on exact histological evidence; that the late malignancy in these cases depends not on a new development, but merely on an increased activity, and finally on a diffusion of the intra-cystic growths; the probability being that these growths are concomitant with and even the causes of the accumulation of fluid in the vestigial structures concerned.

In *Rokitansky's tumor*, cases which have been reported by that author, by Ritchie, and by Tait, the ovary is the seat of a multitude of cysts more or less prominent, and some of them actually pedunculated, varying in size from a pea to a small orange. That these are originally distended Graafian follicles is proved, in the opinion of all three observers, by the fact that in all examined

up to the size of a walnut an ovum was found. Other tumors have been described (Olshausen, Peaslee, etc.) in which the conversion of the ovary into a small number of comparatively large cysts has caused these to be distinguished as multiple rather than multilocular cystomata, implying a supposed origin from a concomitant distention of separate follicles, rather than as the result of a diffuse invasion of the ovarian stroma by the adenomatous process, which is recognized in the development of the typical multilocular cystoma. Tait goes further, and says that an ovarian cystoma is the result of follicular atrophy only, and the fact that ovarian cystomata are never unilocular points to this conclusion. Consistently with the view here expressed, he rejects the term "proliferating" as applied to the multilocular cystomata, and maintains that the smaller cysts must be regarded as secondary to the larger only in point of time. Accepting the position of Waldeyer and Balfour, that in the development of the ovary the follicular epithelium is derived from the germinal epithelium and not from the stroma, Rutherford²¹⁸_{Nov.} considers it needless to discuss whether the origin of the pathological changes which lead to the formation of the multilocular cystoma is (1) in those structures known as Pflüger's ducts in the adult ovary, be these fresh ingrowths from the surface or survivals from a very early stage in the life history, or (2) from the more or less typically mature Graafian follicles. In either case the statement seems adequate that, as physiologically in the foetus, so pathologically in the development of cystomata, the ovarian stroma and the epithelial elements take on a process of intergrowth (Waldeyer quoted by Olshausen), while it is to be observed that, in regard to such structures as the Graafian follicles, maturity, as implying fixity of character at any time before they are ready to rupture, can be predicated only with some qualification.

Intra-ligamentous Ovarian Cysts.—Skene¹⁰⁴⁸ considers this term as embracing only those cysts which are developed from the ovary, and situated completely within the folds of the broad ligament, being thus neither pedunculated nor provided with a sessile attachment, but surrounded by a capsule formed from both folds of the broad ligament. These cysts are developed from the parovarium or the ovary, generally, perhaps, from the paroöphoron. The cysts thus situated are comparatively rare, and two theories have been advanced to explain their unusual position. The first

assumes that the ovary itself is placed between the folds of the broad ligament from developmental error. The second theory is that the cyst burrows during its growth into the ligament. In order that this may come about, it is necessary that the ovary, by a special formation, be closely attached to the ligament or fixed there by inflammatory adhesions. The latter view is supported by some observations in Skene's own cases. They are generally monocysts, though some are multiple. There may be also proliferating or papillary cysts,—a fact accounted for by Bland Sutton by their development from the deeper structures of the ovary—the paröophoron.

The position of the cysts, with reference to the other pelvic organs, is of interest, especially as regards their surgical treatment. They may be in one ligament, displacing the uterus and bladder to the opposite side of the pelvis, or they may occupy a position in both ligaments, between the uterus and the bladder, which are in these cases carried by the tumor to the brim of the pelvis; so that their inferior portion is with difficulty reached by a vaginal examination. Again, the tumor may be behind the uterus and yet within the folds of both ligaments. In this case the tumor occupies the pelvic floor, while the pelvic organs are carried high up out of the pelvis.

The cysts are generally accompanied by most distressing pains in the pelvis, and by more disturbance of the functions of the bladder and rectum than is caused by an ovarian or parovarian cyst. Physical examination shows that the cyst is fixed at its most dependent parts, the fixation being at one side or extending all the way across, according to whether the cyst has burrowed into one or both broad ligaments. Fluctuation is noticeable in the pelvic portion of the tumor. The differential diagnosis from fibro-cysts, which they most closely resemble, is exceedingly difficult. When the cyst is in one ligament only it must be distinguished from intra-ligamentous uterine fibromata, hydrosalpinx, and ectopic gestation. Even after exploratory incision it is difficult to make a correct diagnosis from the inextricable confusion of the parts.

Treatment.—The plan of enucleation as devised by Minor is applicable to more cases than any other, and consequently ranks first in importance. This consists in stripping the cyst-wall from

the broad ligament, and thus enucleating the tumor, although this is sometimes difficult or impossible from the presence of inflammatory adhesive inflammation. The peritoneal surfaces of the edges of the pouch are then brought together by a continuous catgut suture, and brought up and fastened to the peritoneal edge of the incision, if possible, and drainage of the pouch employed; or, the lips of the pouch may be brought up into the lower angle of the wound, and abdominal or abdominal and vaginal drainage established. Another method is to remove the cyst and capsule together by ligating the ligaments below the cyst by unions of the "repeated continuous suture." A combination of these two methods is sometimes practiced, namely, enucleation followed by ligation and removal of the sac. There are some cysts which are so intimately adherent to the different abdominal organs as to make their removal impossible. The plan employed is to treat them by drainage alone, first removing as much of the cyst-wall as possible and thoroughly cleansing and scraping the remainder and uniting it to the abdominal wall. The drainage is necessarily long continued and the convalescence slow.

Striated Muscular Tumors.—Alban Doran²⁵_{July 30} calls our attention to an interesting tumor in a girl of 17, under the care of Terrillon.⁷_{Nov.} She was tapped twelve times. The tumor was ovarian and pedunculated. There was much ascitic fluid. The tumor had the appearance of an encephaloid sarcoma. Vignard gives a very minute description of the microscopical appearance. Sections were found to be made up of interlacing fibres, which bore all the appearance of striated muscular tissue arrived at a high degree of development. Vignard notes that only 2 cases have been recorded of pure rhabdomyoma in structures where striated muscular tissue does not normally exist. Both occurred in the testicles. Myosarcoma with striated fibres is less rare; it has been detected in the kidney and in the testicle. Striated muscular tissue has been found in dermoid ovarian tumors, but Vignard insisted that in Terrillon's case the ovarian tumor had no dermoid characters.

Cancerous Dermoids.—Pomorski³¹⁷_{p. 126} exhibited a tumor the size of a child's head, and consisting of a large cavity filled with hair, epithelial relics, and cholesterine crystals. The inner surface of the cavity was bare of epithelium and undergoing fatty changes.

The outer wall was in most places even, but covered with inflammatory deposit from adhesions, and at the base some irregular tuberosities projected from its surface, which were very firm and represented the parenchyma of the ovary, which had undergone degeneration. These tuberosities bore soft, spongy growths, which had invaded the neighboring intestines. They were found by Pomorski to be cancerous. Alban Doran²⁵ says that two truths must be remembered in regard to the malignant change of dermoid ovarian cystoma. In the first place, we see in microscopic sections from dermoid tumors an infinite variety of epithelial and parenchymatous structures, which may bear the microscopic characters of cancerous or sarcomatous degeneration and yet be perfectly innocent. In the second place, ruptured dermoids give rise to a metastatic diffusion which is clinically malignant, but quite distinct from the metastases of sarcoma and carcinoma.

Sarcomata.—Alexander¹⁸⁷ gives a very interesting description of this comparatively rare disease. At an operation on a young girl, besides the tumor, he found the peritoneum extensively covered with a crop of flat, sessile growths, milky-white in color, of extremely soft consistence, and exuding a milky-white fluid when pressed in the gentlest manner. The patient died seven days later from peritonitis and exhaustion. Spencer Wells, Doran, and Howell give us the first description of sarcomata of the ovary. They are said by Howell¹⁰⁴ to prevail most extensively when the formative and functional activities of the gland are greatest. His description of the gross appearances of sarcoma of the ovary is as follows: "The ovarian sarcomata are not so irregular in their shape as the proliferating cystomata, being usually of oval or roundish contour; their surface is smooth, as a rule, and of a whitish or pinkish-white color; while in consistence they are generally, though not always, quite firm, the round-celled variety being soft and brain-like."

Schröder found the disease in 10 cases out of 600 of ovarian growth; Olshausen, 21 times in 293 cases. Alveolar sarcoma is a very rare disease, indeed.

Amongst the cases of solid ovarian tumors collected by Leopold,⁹⁵ there were 12 of sarcoma; in 5 of these the tumor was on one side only, in 7 on both sides. Of the 6 cases which Leopold observed, 3 were double-sided, as were all those of Olshausen.

Ovarian sarcoma is much more apt to show itself in early life than at a later age, and usually runs its fatal course quickly, whether an operation be performed or not. Baker Brown's case appears to be the only one of round-celled sarcoma cured by operation, according to Beigel.¹⁰⁴⁵

Carcinomata.—Mueller²¹⁴ calls attention to the fact that the disease occurs much more frequently than was supposed. During the last decennium as many as 25 cases have come under observation in his own clinic. Medullary cancer is met with more frequently than the cylinder-celled variety. In two-thirds of the cases malignant disease is combined with cysts.

A unilateral carcinoma is observed as commonly as a bilateral one. The tumors vary considerably in their size. Their shape differs according to the degree of involvement: sometimes they preserve the outlines of an ovary, sometimes they are globular, while now and then their boundaries are diffuse and indefinite. Their surface is mostly knobby, although sometimes fairly smooth; so that this would not be characteristic of carcinoma. In consistence they are either equally dense or dense areas alternate with softer ones. At all events, "dense consistence associated with knobby surface points strongly to ovarian cancer."

Etiology.—The etiology is yet very vague. They occur more frequently in the married than in the single, and generally on the eve of, during, or directly after the climacteric. Their development is often latent, but in some cases the disease comes on rather suddenly. This fact may be explained by the circumstance that the tumor in question often arises as benign cystoid new growths, and only later on assumes a malignant character. This is not infrequently associated with attacks of localized peritonitis. Menstrual disturbances, such as amenorrhœa, menorrhagia, and irregular floodings, are met with in the earliest stages almost invariably. The duration of the disease varies from a few months to two and even more years.

Diagnosis.—The diagnosis of carcinoma of the ovary is based upon such particulars as the presence of climacteric changes; the firm, knobby, or bossellated surface; early development of ascites and adhesions; rapid growth, emaciation, serious menstrual changes, and frequent and early metastases. Palpation proves the tumors, as a rule, tender. They are often found immovable, due to the

development of dense adhesions. Edema of the external genitalia and lower extremities, as well as the general dropsy with ascites, represent a not uncommon occurrence. Freund³⁹⁸ ⁵ _{R.17, No.1, Dec.} lays considerable stress upon the presence of hydrothorax as an evidence of malignancy. This should be differentiated from actual metastatic disease of the pleura. This hydrothorax is no contra-indication to laparotomy; in fact, the fluid rapidly disappears after the operation. This effusion accompanies papillomata of the ovaries, as well as carcinomata and sarcomata.

When the umbilicus is the seat of cancer the diagnosis is easy. Secondary growths on the adjacent peritoneum are not true metastases, but represent rather a sort of implantation of the original neoplasm; this distinction is of great importance clinically, since secondary tumors around the uterus do not contra-indicate operative interference,—an opinion directly opposed to that expressed by Schröder. This applies to all varieties of malignant neoplasms of the ovaries.

Treatment.—With regard to the propriety of operating in these cases, the writer insists upon the similar course of malignant disease of the pelvic organs and that of the breast or the extremities; the patient may live for years, so long as the functions of the important viscera are not disturbed. Even when the latter are affected, the surgeon may prolong life by removing ascitic and pleuritic effusions, breaking up intestinal adhesions, etc. Laparotomy is preferable to puncture in the treatment of cancerous ascites, as in that due to tuberculosis, because not only can the fluid not be entirely withdrawn by the aspirator, but there is more danger of hæmorrhage and collapse. If fluid remains in the cavity it irritates the peritoneum, and thus leads to fresh effusion. In view of the fact that ovarian cancer frequently arises as an apparently benign growth, the only rational therapeutic plan is to remove every ovarian tumor met with as early as possible.

Ovarian Tumors in the Young.—Cases of ovarian tumor before puberty are very rare. Hamaker¹ _{Sept.14} performed a successful ovariectomy on a child of 7 years. In connection with this case he calls our attention to the fact that Roemer² _{Apr.12, '94} removed a dermoid cyst, larger than a child's head, from an infant 20 months old. This is probably the youngest case on record. Neville operated on a child 2 years and 11 months old, Busch had a case of 2

years of age, and Alcott's patient was 3 years old; all these cases were unsuccessful. Schwartz removed a large proliferating tumor from a child 4 years old, with precocious puberty. Barker had 2 cases and Knowsley Thornton 1 case at 7 years, while Spencer Wells, Capples, and Chenoweth,²_{Apr. 12, '94} had each a case at 8 years. Wegscheider reports a bilateral cystoma in a girl 12 years old which weighed 7 pounds, and Marjolin removed a multilocular tumor weighing 19 pounds from a girl of 11. Among 197 cases of dermoid cyst collected by Pauly, Lebert, and Olshausen,¹⁰⁴⁹_{v. 2} 7 cases were in children under 10 years of age. A number of cases of sarcoma and carcinoma of the ovary in children have also been reported by Olshausen and others. Lucas,¹⁰¹_{July, '98} also reported the successful removal of a round-celled sarcoma from a girl of 7, who exhibited precocious puberty.

OVARIOTOMY.

Incomplete Operations.—The general opinion among operators is that, if there is any possibility at all of removing the cyst, it should be done, for the reason that patients often react surprisingly well, even after the most severe operations; while the risk of sepsis and of an exhausting suppuration following drainage is almost as dangerous to her life. Cysts can often be removed successfully, which would seem at first sight to be impossible of extirpation, and for this reason alone specialists only should operate in the field of abdominal surgery. Tait,²_{Nov. 7, '98} says that he is now in a position to say that no cystic tumor of the abdomen exists which cannot be removed. Olshausen¹⁰⁸⁹ says that at the present time it may be claimed that adhesions never make removal impossible, but when the connection of the tumor with adjacent organs, especially the rectum, is unusually firm, and when the papillary formations of the tumor have grown into the wall of the organs, complete extirpation will be impossible. Schroeder has completely extirpated, by a second operation, tumors which he could not remove two years ago. On the other hand Homans,¹⁰⁴⁶_{v. 1, p. 208, '97} in 290 ovariectomies, stitched the cyst to the incision in 8 cases, and all recovered. Terrier,⁹¹_{Dec. '98} in 25 cases recently reported, had 5 incomplete operations. As Buchanan²⁰⁷_{Aug.} says, it is evident from these quotations and statements that incomplete operations occasionally happen in the practice of the best operators; but as their experience

grows such cases become less frequent, even to the point of disappearance, and when they do happen the mortality approximates 50 per cent.

Complications occur in a class of cases where the cyst is so firmly and extensively adherent to the intestines, bladder, and pelvic wall that the removal will result in the rupture of the intestines, bladder, or iliac vessels. Under these conditions Coe,¹ advises vaginal drainage where the cyst is small, deeply seated, and has to be dragged forcibly and stitched in the abdominal incision, because the uterus and bladder, being drawn up with the sac, are fixed in an abnormal position, from which distressing symptoms might result, which it would be difficult or impossible to relieve. Polk,¹ also advocates a similar plan of treatment with the addition of abdominal drainage. In the case of large cysts he would, before opening them, set up adhesions holding them in the desired position, so that afterward they could shrink down to their natural place.

Complications following Abdominal Section.—Baldy¹⁷⁰ calls our attention to the existence of certain sequelæ, among the most frequent of which may be mentioned hernias, simple fistula tracks, fæcal fistulas, pelvic or abdominal pain, and œdema of the lower extremities. Holmes has found that he had 30 per cent. of hernias following his operations. In the official report of Imlach's cases, although there were cases of oöphorectomy needing but a short incision, the percentage of hernias was 15. These hernias constantly tend to increase in size, and when the woman is constantly on her feet or lifting heavy weights there is a rapid enlargement of the protrusion and an increase of the accompanying pain and distress. Some of these cases actually become strangulated and require a second operation. The cause is probably often due to the prolonged use of the drainage-tube, or to improper suturing, or to the impossibility of correctly coaptating the line of incision, followed by a lack of union of the muscular tissues and deep fascias. The peritoneum always unites in a very short time, so that a separate continuous suture is unnecessary. Fistulas are produced by the long-continued use of the drainage-tube, especially if it be neglected and become foul, and by abscesses rupturing through the line of incision and the track never closing again. The extra-peritoneal method of treating the stump in hysterectomy

is a very frequent cause. Cases of fistula have resulted where the drainage-tube was not used, due to the non-encapsulation of the pedicle ligatures. Fæcal fistulas are due to intestinal adhesions to diseased organs, where, after removing the tumor, a rent is left or the injured part sloughs out. An operation for the correction of this accident is usually one of the most difficult in the range of abdominal surgery, as they are deeply seated and bound around by inflammatory products. A continuance of pain following operation is usually due to adhesions formed between the omentum and intestines and raw surfaces left by the operation, and the subsequent dragging on these points. From these very adhesions we may have obstruction of the bowels, with death as the resultant.

Johnson,⁹ reports a case of tetanus occurring on the twelfth day after operation. Three days later the patient died from heart failure. This complication has been reported only a very few times, and has usually occurred within a few days after operation.

Verneuil,¹⁰ recently announced his belief that it was communicated to human beings by horses, the medium being a bacillus. This should teach all who do abdominal sections to avoid the possibility of infection from horses. Homans, of Boston, and Richelot, of Paris, have each had this complication. Peaslee had a case after ovariectomy, which he thought due to the clamp, and thereafter always argued against its use.

Kimbel,⁵⁹ reported 4 cases in his own practice. Three died and the fourth recovered. He thought that more reliance could be placed on opium than anything else, although no treatment had any particular effect.

Statistics.—An analysis of 1322 recent, unselected laparotomies by American surgeons has been recently published.¹⁶¹ It comprises the consecutive work of 82 operators, all the operations having been performed during a period of three years, beginning January 1st, 1886. These operations were not the entire work of all these surgeons during three years, but they are in every case consecutive operations, no selection whatsoever having been made. The general mortality of laparotomy for ovarian and parovarian tumors was 14.7 per cent., and that of the sections for the removal of ovaries not the seat of tumor was but 7 per cent. Notwithstanding the present consensus of opinion against the tapping of ovarian and parovarian tumors, certainly

61 and probably more of the 491 cases of ovarian and par-ovarian cysts had been tapped prior to operation. The increase in mortality, however, of the cases that were tapped was less than 2 per cent. over those not tapped. There were 310 cases in which one ovary only was removed, with a mortality of 15.5 per cent.; whereas, of 158 cases in which both ovaries were removed the mortality was only 11.4 per cent. The mortality after the removal of non-adherent tumors was 8.2 per cent., with moderate adhesions 11.1 per cent., and with grave adhesions 20.9 per cent. The mortality in private hospitals was 11.8 per cent., in private practice 13.5 per cent., and in general hospitals 20.7 per cent. The cases of simple exploratory incision had a high mortality,—12 in a total of 84 operations. So that the devotees of abdominal section cannot yet boast of its perfectly innocuous character.

Influence of the Removal of the Uterus and Appendages on the Sexual Appetite.—Tait,⁴⁰ believes that the removal of the ovaries, or even of the uterus, ovaries, and tubes, has no effect upon the sexual appetite in women, even if they are removed before puberty, and cites 7 cases in support of his theory. Bantock agrees with Tait, as also does Harvey, who had had one singular exception to the rule, in a case in which the sexual appetite was completely lost immediately after the operation. Heywood Smith agreed from experience with the view that the sexual appetite was not, as a rule, interfered with. Referring to the fact that the lives of some women were a misery to them on account of excessive sexual desire, he said that the best and, indeed, only remedy was clitoridectomy. Fancourt Barnes thinks the question a difficult one to answer, as the only proof they have is the woman's word as to the presence or absence of sexual desire. He suggested that women might simulate orgasm out of a natural desire to retain the affections of their husbands. Routh observed that women over 70 were not supposed to possess sexual feelings, the organs of generation being atrophied, but he knew a woman of 78 who experienced erotic feeling on going to stool, and was only cured by clitoridectomy; however, they were all familiar with withered old women who became insane and intensely erotic. He spoke of these cases to prove that the seat of sexual feeling was neither in the uterus nor in the ovaries. It certainly had been traced as taking its origin in the genito-spiral centre of Büdger. He pointed out that children

of 4 or 5 were also known to exhibit powerful erections, in whom there could certainly be no sexual desire possibly present, and therefore the cause must be elsewhere than in the organs of generation.

The Effect of Hysterectomy on the Ovaries.—This becomes a very important question when we consider how often the uterus alone is extirpated, leaving ovaries with full functional activity *in situ*. Grammatikati,³¹⁷_{Re.7} by experiments on rabbits, found that when the uterus was removed and the ovaries left intact the latter continued to discharge their functions. If the subject was killed long after the operation the follicles were found in every stage of development, together with recent *corpora lutea*. The removal of one cornu, whether with or without its tube, had no influence on the functions of the ovary. These researches were confirmed by the examination of the ovaries of a woman who died three years after total extirpation of the uterus. These organs showed no trace of atrophy, and follicles and corpora lutea were detected in every stage of development. His conclusions tend to induce operators, whenever hysterectomy is performed, also to remove the ovaries, so as to spare the patient from the ill effects produced by the persistence of active but useless organs.

SALPINGITIS.

Mignon,¹_{Rept.7} gives the following conclusions as the results of his clinical and histological investigations: 1. Tubal disease tends to propagate itself in the neighboring organs and tissues. 2. This extension is very variable. In some cases the process is limited to the tubes, causing great changes, in which there may be large collections of serum or pus in the distended tubes, but no false membranes or adhesions to neighboring organs. On the other hand, there may be false membranes in abundance, agglutinating the uterine annexa together, while the organs themselves may not be much altered, or may show only secondary alterations. 3. The tubes may become diseased in different ways, either by extension from the mucous membrane of the uterus, or, secondarily, in consequence of inflammatory processes in their vicinity, transmitted through the lymphatics. 4. Tubal disease is usually bilateral, though it may differ in degree on the two sides. 5. The anatomopathological changes may be varied, depending upon the coinci-

dence of many conditions, such as the intensity of the process, its duration, the cause, and the point of departure; again, the changes may be primary or secondary, as in cases in which there is muscular hyperplasia or atrophy of the walls in consequence of the pressure of the contained fluid. 6. The phenomena of atrophy and hypertrophy are those which ordinarily attend inflammation. These are changes in the vessels, the emigration of white and red blood-corpuscles, swelling of the tissues, and the formation of connective tissue. 7. Effusions of blood sometimes take place into the tubal walls, but the presence of blood in the cavity of the tube does not necessarily indicate the existence of hæmorrhagic salpingitis. 8. In many cases the tube is divided into cavities of varying capacity, lined with cylindrical epithelium. Some of these cavities may communicate with the general lumen of the tube, while others are separated from it. They are sometimes found in tubes which are enlarged, and sometimes they are in tubes which have walls of normal thickness. 9. The ovaries almost always participate in tubal disease, and may exhibit oöphoritis or peri-oöphoritis, cystic degeneration, cicatricial contraction, or atrophy, with disappearance of the glandular tissue. Atrophy of the ovaries is also found in some cases in which the uterine annexa are imbedded in solid and extensive false membranes.

Catarrhal Salpingitis.—The resemblance between the lesions of salpingitis and those of chronic endometritis is very striking, consisting of an infiltration of the mucous membrane, with small cells and the formation of glandular pockets lined with cylindrical epithelium; although in the wall of the uterus such pockets or glandular tubes appear to be a mere multiplication or perverse growth of the glands normally found there, yet in the tubes which contain no glands they are wholly abnormal, while the figures which resemble them are merely cross-sections of the longitudinal folds of mucous membrane. This interesting fact has been pointed out by Cushing²³ in an editorial on the subject. He also says that the thickening of these folds of mucous membrane produces recesses or pockets which appear on cross-section to be closed sacs; although they are not considered to be really closed ulcers, there is evidence of distension with secretion. These glands may bore their way into the muscular wall of the tube, where, physiologically, there are no glands; the tube thus becomes thickened and capable of exuding

a large amount of catarrhal secretion, which, if retained, gives rise to the well-known forms of distention of the tube. It is easily conceivable that in such a condition, where glandular pockets are burrowing in the wall of the tube and approaching near the peritoneal surface, an adhesive inflammation would be excited in the walls of the latter, gluing them to the surrounding parts. It is therefore unnecessary to refer the attacks of adhesive pelvic peritonitis to the escape of secretion from the abdominal end of the tube, although this mode of origin may undoubtedly occur in the earlier stages; and may not such glandular growths pass entirely through the walls of tubes and cause such attacks of inflammation of the surrounding peritoneum as are, in fact, known to occur? Arguing still in its analogy to the uterus, the author shows how important these glandular pockets might be in nourishing the ovum of a tubal gestation.

Purulent Salpingitis.—Hall¹²⁰ believes that the disease may be contracted in two different ways: (a) By a chronic process causing dropsy of the tube, which by repeated attacks of inflammation is changed to pus. (b) It may be rapidly produced by an acute process following gonorrhœa and puerperal diseases. Cullingworth¹²¹ believes gonorrhœal infection to be second only to post-partum sepsis as a cause of pelvic inflammation. He says that acute gonorrhœa in the female is not, as is usually stated, an acute vaginitis in the great number of cases. When vaginitis is present it is usually slight in degree and of apparently insignificant importance. The more-constant lesions are inflammation of the ducts of the vulvo-vaginal glands and the mucous membrane adjacent to their orifices, urethritis, and inflammation of the cervical mucous membrane, accompanied with erosion around the os uteri and a purulent discharge. The inflammation tends to spread to the endometrium and the mucous membrane of the tubes. While not admitting the extreme *dicta* as to the incurability and the latency of gonorrhœa in the male, the author believes that the disease, although apparently cured, may be aroused into activity by sexual intercourse and infect the woman, as has apparently been the case with the newly married, and it can be assigned as the cause of the broken-down health of girls who had been perfectly well before marriage.

Schmitt⁹⁵ believes that it may result from gonorrhœa in one

of two ways : either the specific poison may be transmitted directly along the tubal lining membrane, while at the same time the wall of the tube may serve as a channel through which the serous covering is affected (though the inflammation is not specific, since it is improbable that the gonococci could penetrate the wall) ; or, the gonorrhœal pus may escape into the peritoneal cavity and thus induce perimetritis, which, however, we have no reason to regard as specific in character. The presence of gonococci in the escaped pus cannot be regarded as an argument in favor of the existence of a specific perimetritis, since the acrid character of the pus constitutes its real virulence.

Diagnosis.—Winauer's ³¹⁷_{De.M., 95} article on Thure-Brandt's method as an aid to the diagnosis is quite suggestive, although his observations were unfortunately not confirmed by laparotomy or by autopsy. Referring to the difficulty which is experienced in distinguishing, at the examining table, a dilated tube when buried in a mass of exudation, he calls attention to the ease with which the diseased tube or ovary may be mapped out after the adhesions have been stretched by a course of pelvic massage. After a prolonged treatment the abdominal wall becomes relaxed, the adhesions distensible, and the original tenderness so much diminished that it is possible to make a perfectly satisfactory diagnosis without administering an anæsthetic. Apropos of this subject, attention should be called to a recent article by Schauta, ⁹⁵_{B.M.J., 1} in which he refers especially to the condition which he terms *salpingitis isthmica nodosa*. This is simply a localized hypertrophy of the tube which gives rise to nodular swellings situated at the uterine end. These may be mistaken for small myomata or for old exudations, but they usually are bilateral and continuous with the tubes. They are due to localized hypertrophy of the muscular coat resulting from salpingitis, usually of gonorrhœal origin. As a characteristic symptom, the writer notes the occurrence of periodic attacks of colicky pain at the time of menstruation, which he attributes to contractions of the tubes in their attempts to overcome the stenosis at the isthmus ; hence the muscular hypertrophy at this point.

Tubercular Salpingitis.—Tubercular disease affecting the Fallopian tubes to such an extent as to demand their removal is exceedingly rare, although it is not uncommon to find the disease on one or both sides to a slight extent, but associated with a general

tuberculosis, and not of itself producing distressing symptoms. Griffiths,²_{v.1.78} has given, as his opinion, that the most common seat of tubercle in the female generative apparatus is the Fallopian tube, then the uterus, and lastly the ovary. Greig Smith²²⁴_{Nov. 22} estimates that nearly 100 cases have been treated by abdominal section in the past twenty years. Two died directly from the operation, 3 in from five to twelve months, and 25 cases were of from nine months to twenty-five years' duration. While he thinks the reports have been too favorable as to recovery, yet he says "there can be no doubt that a considerable number of cases of undoubted tubercular peritonitis have been cured by abdominal section."

Werth,⁸¹⁷_{July 20} in considering only those cases in which surgical treatment is indicated,—that is, those in which the tubes are affected,—says that two forms of tuberculous disease should be distinguished,—an acute and a chronic; in the former both the muscular and serous coats undergo cheesy degeneration, numerous bacilli being found in the interior of the tube, while in the latter the tubal wall undergoes hypertrophy and cell-infiltration, while its contents contain only a few bacilli. The increase in the size of the tube, which may be considerable, is due to the collection of pus in its interior, as well as to the hypertrophy of its wall. With regard to the treatment of this condition the writer does not agree with Hegar, who advises extirpation of the tuberculous tubes, even when the peritoneum is affected (when the disease is limited) and the tubes are evidently the original foci, especially if they contain pus. Under these circumstances Werth simply evacuates the contents of the tube, which does not refill.

Treatment of Salpingitis.—Mangin⁴⁶_{July}; ⁷⁸⁰_{Oct. 19} has just published an interesting article on the treatment of catarrhal salpingitis. He advocates, in the acute period of the disease, absolute rest in bed, very hot vaginal injections or ice to the stomach, according to the gravity of the symptoms; morphine, chloral, bromide or anti-pyrin; removal of all constriction about the abdomen, and the use of revulsives. Acute salpingitis thus treated is quite commonly followed by spontaneous resolution. In common with the associated affections, metritis, ovaritis, and pelvic peritonitis, it may yield to this antiphlogistic treatment, faithfully carried out. There remains a tendency to slight relapses for a few menstrual epochs and a persistence of more or less structural change in the tissues,

but this is compatible with a very fair state of health. The most formidable residuum is sterility, and even this is often but temporary. When chronic salpingitis supervenes, unless due to certain degenerative changes, either primary or secondary, such as tubercle, papilloma, carcinoma, or syphilis, the most common cause of the formation of cystic accumulations is the existence of mechanical obstruction of the oviduct at its uterine extremity. This may be due to fungoid vegetations of the mucous membrane of the uterus or tubes, or to an atresia of the uterus itself, due sometimes to a temporary spasmodic flexion of the organ. This condition Doléris^{426 101}_{Revue, 1891, Apr.} treats by dilatation of the uterus, curetting its cavity, and the establishment of drainage. The steps of the procedure are as follow: After preliminary dilatation with disinfected laminaria tents, the cavity of the uterus is distended by the use of a series of sponge tents dipped in sublimate ointment, 1 to 1000, until it will admit one finger readily. The entire cavity of the uterus, but more especially the cervix and Fallopian orifices, is then thoroughly scraped with the curette to remove any trace of fungoid growth. The cavity thus prepared is firmly packed with iodoform gauze soaked in glycerin. The tampon is removed every day or two until bimanual examination shows that the pelvic tumor has disappeared. When this occurs the quantity of gauze is progressively diminished, it being unwise to remove the pressure suddenly. The after-treatment consists in daily irrigating the vagina with antiseptic solutions, followed by a tampon soaked in a 5-per-cent. glycerole of iodoform. Failure is due to the patient having resumed her ordinary habits too early, or to her not taking proper precautions at the succeeding menstruation. The uterus must undergo a sort of involution, and, until this is accomplished, fatigue, coitus, and sudden exertion should be avoided. The next menstrual period should be passed in bed. Finally, it is essential to treat by appropriate measures any chronic inflammatory condition of the uterus or stenosis of its lumen. The author attributes his results to the shortening and widening of the intra-mural portion of the tubes, which is produced by distention and thinning of the uterine wall, to the relaxation of spasms and improved vascular supply as an indirect result, and, lastly, to the local effect of the glycerin. This procedure deserves a trial in cases which arise from the existence of a catarrhal salpingitis, and in which there is a fair

chance that the evacuation of the contents and removal of the exciting causes will result in re-establishing the patulous condition of the tube.

Abdominal Section.—The details of the operation are familiar to us all: A short incision to avoid the dangers of ventral hernia; the intestines should be disturbed as little as possible; all adhesions should be broken up, the uterus restored to its natural position, and the diseased organs removed *in toto*. No foci of inflammatory disease should remain, lest they cause a septic peritonitis. The parts can be reached with greater ease if an assistant push the pelvic viscera upward and forward by means of a finger in the vagina. A *kolpeurynter* may be introduced in the vagina for the same purpose. In case the hæmorrhage is very profuse and the tissues rotten, Boldt²⁷_{V.M.N.S.} suggests the use of an iodoform-gauze packing, which restrains the hæmorrhage, acts as a drain, and leaves the pelvic cavity inodorous and dry on its removal. In event of any pus escaping into the abdominal cavity, irrigation should be used; this may consist of a hot saline solution, a portion of which can be left to be absorbed by the peritoneum as a means of reaction. Gusserow⁹⁶_{M.M.S.; M.N.S.} does not irrigate when pus escapes, but carefully washes it away at once with a sponge soaked in sublimate solution. A drainage-tube will often be necessary to restrain oozing adhesions and give a means of escape to any fluid which may collect.

On the other hand, Sinclair⁴⁹_{M.S.} recommends a vaginal incision when the abscess is in the Fallopian tube or in the ovary, and so firmly jammed down in the pelvis as to be safely dealt with *per vaginam*. In these cases he finds that nature has always made a great effort to prevent the abscess from bursting into the abdominal cavity, and for this reason it is surrounded by a wall of lymph and a mass of adhesions, which would probably prevent any dangerous results from septic absorption. The after-treatment would be to wash out the cavity and inject with iodine. Routh⁴⁹_{M.S.} under similar circumstances, would aspirate the abscess from the vagina, and then, without removing his cannula, wash out the cavity and then inject with iodine. This treatment should be kept up for a week or ten days.

T. More-Madden, Dublin (collaborator), from increasing observations, is confirmed in the belief that in some instances these

tubal diseases, more especially in cases of hydrosalpinx, may terminate favorably without any surgical treatment, and, moreover, that in other cases such collections, whether purulent or serous, may be evacuated by cautious aspiration through the vaginal roof.

Rochet,³⁰⁴_{Dec. 15, '98} agrees with Laroyenne that, where the diseased tubes are so buried in adhesions as to be non-removable without great danger, it is preferable to puncture through the vagina, enlarge the opening, wash out the sac, and treat the case as one of ordinary pelvic abscess.

An able criticism,⁵_{May} on this subject expresses its disapproval of the views advanced, since they imply a radical misconception of the difference between pyosalpinx and pelvic abscess proper. The latter is an abscess, pure and simple, a circumscribed collection of pus; the former is an entirely different condition, both etiologically and clinically. No one denies that a true pelvic abscess may be cured by incision and drainage *per vaginam*, but he is a timid surgeon who would adopt such treatment in a well-recognized case of pyosalpinx.

Salpingostomy.—Under this term Skutsch⁸¹⁷_{Aug. 10} describes a palliative operation for the cure of hydro- and pyo- salpinx. He suggests, in these conditions, puncturing the tubes by means of a Pravaz syringe, and the removal of the contents. If the contained fluid is clear serum, free from pus, he opens the ostium, allows the contents to escape, and then cuts out of the tubal wall, near the ostium, an oval piece about 1 square centimetre in size, and unites the mucous and serous membranes by fine silk sutures around the hole thus formed. A sound is then passed through the tubal canal into the uterine cavity on both sides to insure their patency. He has performed this operation with successful results. The writer admits that this would be a hazardous procedure in cases of pyosalpinx, but proposes to sew the end of the diseased tube in the abdominal incision, and thus allow the pus to escape. When the discharge ceases to be purulent the tube can be freed from its abdominal attachments and replaced in the pelvis. As a criticism²⁵_{Oct.} on this subject, it could be said that chronic disease of the appendages involves serious changes, especially when the tubes are occluded. The diseased parts cannot be handled in abdominal section without great risk. The tube is often tensely distended, and adhesions to neighboring structures are usually intimate.

Hence, the tube may easily be ruptured, intestines torn, and circumscribed collections of pus diffused. It is impossible to say to what extent a tube which has been long out of working order may be restored to its functions; the corresponding ovary also may be hopelessly disorganized.

Treatment by Massage.—Boldt, ²⁷_{v. 22, No. 6} gives us an account of Thure-Brandt's method of pelvic massage in this class of cases. After describing the position of the patient and the best manner in which the physician may utilize his forces, he speaks of this treatment as especially applied to the ovaries and tubes. In the case of ovaries which are displaced by bands of adhesions, he introduces his finger into the rectum or vagina, as the case may be, in order to get the internal finger to the adherent surface of the gland; the fingertips of the external hand describe rapid, small circles to the adhesions, thus endeavoring to free the ovary. This being accomplished, the adhesions are gently stretched, carrying the ovary toward its normal position, at the same time using massage to the adhesions. When using massage for oöphoritis and peri-oöphoritis, the gland itself is treated with the small, rapid circle-movements, with very light pressure, more force being brought to bear on the surroundings, so that the small cysts frequently present on the surface of the ovary are seldom or never ruptured, and, should it occur, there is no danger. Boldt has come to no favorable conclusion in the efficacy of this treatment in inflammation of the tubes, with occasional exceptions. Whenever the tube is dilated, and we have made sure that the uterine opening is patulous, the treatment, as Brandt directs, may be tried. Begin near the uterine extremity and always in a direction toward the uterus. Small circle and short, stroking manipulations will be found to answer best. If the abdominal walls are not sufficiently thin and flaccid to allow of exact manipulation, distended tubes, especially if they contain pus, should not be touched unless the operator is prepared to do abdominal section at a moment's notice. Brandt is credited by Theilhaber ³⁴_{No. 32, 1886} with venturing to attempt the emptying of a distended tube into the uterus by "rolling it gently between the fingers of both hands," a manœuvre which, it is admitted, often causes an "escape of secretion into the peritoneal cavity, which readily gives rise to transient symptoms of peritonitis." Boldt's personal experience is that in treating tubal disease patients

may improve temporarily, but in a few weeks they will be as badly off as ever, and even during the treatment such exacerbations are apt to occur.

As to the use of *electricity in salpingo-oöphoritis*, the following are the *résumé* and conclusions of Apostoli,⁷⁶⁰ whose experience warrants his authoritative stand on this subject. It comprises the methods of application, which, mentioned in the order of their increasing efficacy, are: the faradic current of tension, the simple galvanic intra-uterine application, and the vaginal galvano-puncture. He believes in rigid antisepsis during treatment, and the use of gauze, saturated with iodoform, sublimate, or salol, to maintain perfect antisepsis and prevent sexual relations. Confinement in bed will always aid the efficacy of the treatment, and it is obligatory after galvano-cauterization, and especially galvano-puncture. Of the two localizations of the faradic current, either the vaginal or uterine, he advises the latter, with the use of the bipolar sound, as being more efficacious. The faradic current of tension is only tolerable, and indicated in the acute and subacute forms; and the faradic current of quantity, which is less efficient and less tolerable, ought to be excluded, except in certain rare chronic cases which are very old, in which it will be able to render some service. The faradic current of tension is an excellent and rapid sedative, which calms the acute condition, diminishes the pain and nervous excitability, but remains powerless against the development of the inflammatory process. The current of quantity will be able in certain chronic forms to aid in the absorption of exudates by stimulating the intestinal circulation. Faradization should be applied here in moderate doses, especially if the condition is acute, lasting at first only from five to ten minutes and never overstepping the bounds of individual toleration. In the use of intra-uterine galvanization, or, more properly speaking, chemical galvano-cauterization, we get an excellent method of progressive and total destruction of the mucous membrane, of rendering healthy the uterine cavity, and of peripheric deviation. Its advantage over the curette is that it is absolutely harmless; it can be localized in the whole or in a part of the uterine cavity; it is progressive, not violent, and never instantaneous; it is mathematically dosable, and thus acts as may be desired; it is acid or alkaline, at will; it is generally tolerated and requires no

anæsthetic; it is not contra-indicated by any acute condition; it unites to a local superficial action a trophic, general antiseptic and interpolar action. The positive pole always causes less congestion than the negative, the latter bringing about resolution more rapidly; therefore, the positive pole should be applied in the beginning, giving way to the negative later on. The treatment should take place once or twice a week, and the duration vary from three to eight minutes, the intensity being increased to the tolerance of the patient and the clinical indications; beginning with 20 to 40 milliampères, it will reach, progressively, 100 to 150. Every salpingo-oöphoritis which is not rapidly modified by the intra-uterine galvano-cauterization ought to be treated by the vaginal galvano-puncture, which is generally more efficacious. "In galvano-puncture use a very small and sharp steel trocar, and never bury it more than a centimetre, avoiding the anterior *cul-de-sac*, and making the puncture behind or at the sides of the uterus into the point of the inflammatory tumor most prominent in the vagina. Always have the needle well insulated, and avoid any arterial pulsations by previously exploring with the finger. These punctures should be repeated only after the reaction from the preceding one has disappeared, and the intensity should vary from 50 to 250 milliampères, and their duration should be from five to eight minutes. The positive puncture will be generally indicated in the beginning as less dangerous and causing less congestion than the negative, and it will establish better the adhesions between the uterine appendages and the vaginal wall. The negative punctures will generally produce more resolution in high doses, and will aid in creating a vaginal fistula from the tumor in case this is deemed necessary. Almost every salpingo-oöphoritis will be amenable to an appropriate electrical treatment. It is sovereign in the catarrhal salpingites, calming in the tuberculous salpingo-oöphorites, and capable of curing certain purulent salpingo-oöphorites by the establishment of a vaginal drainage. Every course of electrical treatment, whatever may be its duration, ought not to cease until the patient declares herself symptomatically cured and examination shows a considerable anatomical resolution."

Hæmatosalpinx due to Atresia of the Vagina.—Leopold ⁹⁵_{B.M.E.J.} has reported several cases on which he performed operation. A

natural consequence of his clinical observations was the necessity for a second laparotomy to remove the other appendage, and thus complete the castration. If we have to deal with a collection of blood in the vagina, a very slow and regular flow of the fluid should be obtained by means of small cuts in the occluding membrane and the insertion of a glass tube. Injections should be avoided, if possible, as they promote the flow. After completely emptying the vagina, examination must decide whether there is yet any collection of blood in the tubes and uterus. If there is complete absence of the vagina, he advises making an artificial vagina, opening the closed uterus with a broad incision or the trocar, and keeping the new opening patulous. If this cannot be accomplished laparotomy should be performed.

Fuld,⁸⁵ has analyzed 65 cases, 48 of which terminated fatally. Thirty-nine patients were operated upon, 17 being cured. Among the different methods of treatment Kaltenbach recommends puncture *per vaginam*, especially when rupture seems imminent, several cases having been thus treated with success. Hausmann approves of puncture through the abdominal wall, but no successful cases have been recorded; the same is true of puncture *per rectum*, as practiced by Brown. Removal of the hæmatosalpinx is most popular, Schroeder having performed the first operation. Breisky and most other surgeons advise emptying the uterus before resorting to laparotomy. The author agrees with them, and recommends that if the tubal sac does not become smaller as soon as the hæmatometra has been evacuated the abdomen should be opened. Laparotomy should also be performed promptly if the sac disappears suddenly after emptying the uterus (provided there is not a characteristic discharge of inspissated blood from the tube), as it is probable that the tube has burst, and that its contents have escaped into the peritoneal cavity.

Open Fallopian Tubes.—Wallace,² contributes a short but suggestive paper on this subject, in which he inclines to the belief that patency of the tubes is a normal post-partum condition due to subinvolution of these ducts, and referable to the same causes as subinvolution of the uterus. Relaxation of the uterus may also account for non-closure of the ostium uterinum. He dismisses as absurd the old idea that the lumen of the tube becomes larger during menstruation in order to allow the passage of the ovum.

It may happen that only one tube is patent during gestation, the ostium uterinum of the other being covered by placenta. Certain symptoms are mentioned as accompanying patency of the tubes, although they are not clearly defined. In exploring the pelvic cavity in a typical case, the mucous membrane of the vulva and vagina is congested, red, and livid, and this is intensified on the shortened, swollen, and œdematous *cervix uteri*, which fills the calibre of the largest speculum. The os is patulous, eroded, and is filled with a plug of ropy mucus. The uterus is large and retroverted, and the ovaries and tubes are normally felt behind it. A blunt-pointed sound, if introduced up to either cornu, can, with a little manipulation, easily be slipped into the open tube, and may be passed up to the hilt, when the tip will be felt through the abdominal wall. The patient experiences no pain or subsequent discomfort. No force should be used, the sound being held between the thumb and finger. The prognosis of these cases is rather doubtful. The treatment consists in hot vaginal douches, replacement and support of the uterus, and weekly catheterization of the tubes. No intra-uterine injections should be given. When the probe, on being introduced, is grasped by a firmly-contracting uterus, the surgeon may infer that the organ is recovering its tone, and that the tubes will soon close.

ECTOPIC GESTATION.

Lawson Tait²³ has suggested the term *ectopic* because he considers that, by altering our nomenclature, the variety of ectopic gestation known as the interstitial is brought within the scope of our term. Then, again, the cornual form of pregnancy was regarded as extra-uterine, which is not the case, while it is undoubtedly ectopic. We have therefore two conditions which we bring under the word ectopic, and which are not included in the term extra-uterine gestation.

Etiology.—The seat of contact between the ovum and spermatozoon has not as yet been determined with absolute certainty, but most authorities, such as Bischoff, Hermann, Foster, Gray, Landois and Sterling, Dalton, Flint, Carpenter, Power, Chapman, Meadows, and a host of others, affirm that it occurs in the Fallopian tube or in the ovary itself. Thus, we can readily see that any abnormal condition of the tube might stop the impregnated ovum

in its course toward the uterine cavity, thus causing a *tubal pregnancy*, or the impregnation of an ovum *in situ* might cause an *ovarian pregnancy*, and that possibly an impregnated ovum dropping into the abdominal cavity upon a spot affected by inflammatory change might develop and produce a *primary abdominal pregnancy*.

Townsend²¹⁶ says: "Regarding the function of the tubes and ovaries, Tait has proven conclusively to any mind that ovulation can and does take place before, during, and even after menstruation ceases (menopause); also, that the changes in the ovary at puberty are simply vascular, and that those in the tubes are vascular and epithelial, and that the change of greatest importance is in the functional movements of these accessory organs; that is, the 'grasping,' so to speak, of the ovary by the fimbriated extremity of the tube at only stated times, viz., during the menstrual epoch. Ovulation, then, and menstruation are not necessarily coincident, for, as Tait, Jackson, and Townsend have shown, it is not always that the passage of an ovum takes place through the tube, though its fimbriated extremity is grasping the ovary, for frequently it happens at such times that there is no ripe ovisac present."

If, then, as has been shown, ovulation continues intermenstrually, when the tubes are quiescent, the question naturally arises, What becomes of the ovum when the ovisac ruptures? There is only one place it can go to, and that is into the peritoneal cavity, where it perishes and is absorbed. Tait, in speaking on this subject,¹⁰³⁹ says: "I believe that the ovum falls into and perishes in the peritoneal cavity in by far the greater number of cases, and that the passage of it into the uterus occurs only in a small minority of the ova produced."

Ectopic Gestation with Expulsion of the Fœtus per Rectum.—D. B. Van Slyck⁴⁴ reports the case of a 6 months' fœtus delivered per rectum, in which the absence of the umbilical cord was a unique feature. The placenta, evidently attached to the front of the fœtus, had been forcibly torn away, carrying with it the heart, liver, and intestines, all of which organs were missing. Pressure of some part of the fœtus, probably a foot, had thinned the wall of the transverse colon, through which, obviously, the fœtus had escaped. From this point it traversed about two-thirds of the transverse colon, the descending colon, and the rectum to its exit

at the anus. James P. Tuttle²² also calls attention to a case of his own, in which rupture occurred through the rectal wall and delivery of a 4 months' foetus intact. Both mother and child died.

Autoriello⁸ reports the case of a multipara who attempted manually to remove an offending substance from the rectum and grasped the leg of a foetus. On admission to the hospital she was extremely prostrated. A foetus about nine inches long was removed from the rectum; the foetal cyst was thoroughly cleansed and disinfected, and a large drainage-tube inserted. Under a strictly-antiseptic and stimulating treatment the patient recovered; the rectal opening gradually cicatrized as the sac became obliterated, and she left the hospital before Autoriello had an opportunity to close the small rectal opening remaining.

Tubal pregnancy, with rupture and discharge of the ovum into Douglas's *cul-de-sac*, had existed, with final discharge of the foetus per rectum. The foetal appendages had necrosed and been discharged in the same manner.

Ectopic Gestation in Rudimentary Uterine Cornua.—Himmelfarb⁵⁸⁵ has collected 33 cases of this anomaly; in 24 the uterus ruptured, with 1 death. In 3 cases a lithopædion was formed. In 7 laparotomy was done after the foetal death, with 1 maternal death.

The Diagnosis of Ectopic Gestation.—J. C. Reeve⁵ classifies cases of extra-uterine pregnancy as follows: 1. A very small number present no well-marked symptoms and go on to full term; labor sets in, and then only the true state of affairs is discovered. 2. A somewhat larger but still a relatively small number are first announced by the symptoms, which speedily overwhelm the patient. Rupture of the cyst occurs, and death by shock and hæmorrhage speedily ends the scene. 3. A large majority of cases in which marked symptoms are present from an early period. Of these symptoms no single one may be pathognomonic, yet by a concurrence of several of them at once, or by several appearing in succession, a diagnosis may generally be made.

It is to these symptoms that Reeve calls our attention. First in order comes the probable existence of a pregnancy, with the normal reflex symptoms; the patient also believes herself pregnant. This has been the case so frequently that some authorities hold it

to be essential, notably Bernutz and Goupil,¹⁰⁵³ who found this feature absent but four times. Tait¹⁰⁵⁴ expresses the opinion that no reliance can be placed in it.

Two points are to be noted in regard to the pregnancy: 1. In extra-uterine cases a considerable period of barrenness has preceded its occurrence so frequently as to have attracted special attention, either after the birth of a child or after marriage. 2. The ordinary symptoms of pregnancy are likely to be exaggerated, especially those of the pelvis. In the language of Parry, "the pregnancy is a stormy one."

In an examination *per vaginam* two features demand especial attention: 1. The vaginal wall over the cyst or tumor shows active pulsation; vessels can be felt beating by the finger. This feature was recognized long ago by Baudelocque. 2. The size of the tumor can be observed to increase more regularly and rapidly than belongs to any condition likely to be confounded with it. Thomas says the increase can be noted from week to week. One valuable diagnostic point often overlooked is the patulous condition of the cervix, which is sooner or later present in all cases of ectopic gestation. The bimanual and fluctuation tests show the uterus to be empty without the use of the sound.

Two symptoms belonging to a later period are ballottement and the effects of pressure upon the pelvic organs. Ballottement, however, has been observed by Thomas¹⁰⁴⁴ as early as the third month.

Reeve classifies the symptoms partially in the order of their occurrence, but especially as to their diagnostic value, as follows: 1. Suggestive. (a) The general and reflex symptoms of pregnancy, especially if the pregnancy had occurred after a considerable period of barrenness. (b) Disordered menstruation, especially metrorrhagia, coincident with symptoms of pregnancy; gushes of blood accompanied by severe pelvic pains. (c) Severe pains in the pelvis; attacks of pelvic pain followed by tenderness in either iliac region, and other symptoms of pelvic inflammation. 2. Presumptive. (a) The existence of a tumor, this tumor presenting the characteristics of a tense cyst, sensitive to the touch, actively pulsating; steady and regular growth of the tumor to be observed. (b) The os uteri patulous, the uterus displaced and empty. 3. (a) Paroxysms of violent and overwhelming pain in

the pelvis, with general symptoms of collapse. (b) Expulsion of the decidua.

Differential Diagnosis.—Strahan¹⁰⁵² cites the following list of conditions liable to be mistaken for extra-uterine pregnancy, as given by Thoburn: 1. Intra-uterine pregnancy. 2. Normal pregnancy, with retroversion or retroflexion. 3. Pregnancy in one corner of a bifid uterus. 4. Ovarian tumor. 5. Cyst of the broad ligament. 6. Fallopian distention. 7. Uterine tumors. 8. Pelvic hæmatocele (simple). 9. Pelvic inflammatory exudation or abscesses (simple). 10. Cancer of pelvis or peritoneum. Skill in the bimanual examination and a careful mental survey of all the possibilities in the cases are the chief means of success in the differential diagnosis. Repeated examinations may frequently be necessary. Most unreliable is the history of extra-uterine pregnancy, and usually the form of the tumor.

Jewett¹⁵⁷ says that between hæmatocele from rupture of a tubal pregnancy into the broad ligament and hæmatocele from other causes there is no diagnostic distinction, if the ovum be dead. While the ovum lives the signs of pregnancy may serve to differentiate. After the viable period the case is usually clear. After the foetal heart-tones are available there is no possible source of error, if the uterus be empty. With excessive thinning of the abdominal and uterine walls, however, advanced utero-gestation may simulate extra-uterine pregnancy.

At the full period of gestation spurious labor is the invariable rule. Secondary rupture may occur at this time, usually with a fatal result, unless the surgeon steps in. Lactation is frequently established for a time.

Pregnancy in one horn of a double uterus, like interstitial pregnancy, must often be impossible of identification, even in the most skillful hands. Yet pregnancy in a very undeveloped horn is practically extra-uterine and will end in rupture, just as tubal cases do.

After the full period of pregnancy and the foetal death is the most difficult time of all in which to make the diagnosis. The uterine souffle disappears shortly after the foetal heart-sound. In a case observed by Petch it persisted for fourteen days after the foetal death. The shape of the child is so much altered when the liquor amnii begins to be absorbed that it affords no aid. Some

reliance may be placed upon the history of pregnancy, of false labor, a show of blood during the false labor, and a decrease of size thereafter, yet histories alone are not to be trusted. Hæmorrhage at false labor and the diminution in size of the tumor afterward, Tait says, are constant. The uterus is always intimately connected with the tumor, most often in front of it. The uterus, when the placenta is on the back of it, is always enlarged until the placenta begins to be absorbed, and the cervix is always more or less open. The gestation sac is often ruptured by the contraction of the abdominal muscles during spurious labor, and with a rapidly-fatal result, unless the surgeon interferes. Very rarely the child has been known to live several months after term. Dermoid cysts and cancer are the conditions most frequently mistaken for a dead extra-uterine fœtus.

TUBAL GESTATION.

Tubal pregnancy is considered a most frequent form of ectopic gestation, and by some authorities is said to be the only form. It is ascribed usually to a number of causes, such as loss of ciliated epithelium, due to inflammatory trouble, allowing thereby the fecundated ovum to rest and develop in the denuded spot; flexions of the tubes; dilatations with hernial pouches produced by the protrusion of the mucous membrane through separate bundles of the muscular fibres; constrictions from inflammatory changes, causing adhesions; obstructive catarrh, physiological aberrations, or even paralysis, have all been assigned as factors. Pressure from tumors is also said to cause it.

Pathology.—The pathological changes, that will naturally vary according to the duration and behavior of the pregnancy, are fully described by Townsend,²¹⁶ who says that as the growth of the ovum continues the mucous membrane of the tube thickens, the tubes themselves gradually distend, the villi enter the mucous membrane, and, according to Bandl, “the two poles of the decidua-like covering are closed, though sometimes the uterine end remains open and in continuity with the mucous membrane of the tube and the decidua of the uterine cavity.” Hennig remarks that a decidua reflexa is rare.

The villi continue in their growth, penetrating the mucous membrane to the muscular layer, but, according to Leopold, never breaking through the walls of the maternal vessels, nor are any

evidences of blood to be found, as is presumed to exist in intra-uterine development between the villi. The vascularity of the vessels of the tubes and those of the broad ligament in which they lie is greatly increased; the muscular fibres of the tubes, enlarging at first, subsequently become markedly thin by stretching from the continued and increasing pressure due to the growth of the ovum, which finally ruptures the tube, usually between the second and third months. According to Tait, the most common seat of rupture is through the surface of the tube into the cavity of the peritoneum, because, as he says, "the proportion of the circumference of the tube which is covered by the peritoneum is very much greater than the proportion of the circumference of the tube which is related to what is called the cavity of the broad ligament." As a result of such tubal ruptures the placenta is frequently lacerated and the hæmorrhage is excessive, which pours into the peritoneal cavity, death being frequently due to shock, hæmorrhage, or, if not from either of these, purulent peritonitis is apt to develop.

Associated with the rupture in the wall of the tube may be that of the ovum, with the escape of the foetus into the peritoneal cavity, or it may be that the ovum remains whole, and in such condition falls into the abdominal cavity; should the ovum, though, remain in the tube, which is rare, indeed, and most favorable, the extent of the hæmorrhage may be lessened. Spiegelberg mentions three instances where this form of extra-uterine pregnancy advanced to full term, and Hofmeier still another. In all these cases the enormous muscular development in the tubal walls was characteristic. Fatal as this form of ectopic gestation usually is, recovery may occur in case of premature death of the foetus before the tubes give way; and, even after rupture has taken place, recovery is possible, owing to the formation of inflammatory false membrane around the embryo of the entire ovum. In this connection we would mention the successful removal by Eastman²⁷ of an 8 months' child "with all its appendages" in a case of intra-ligamentous tubal pregnancy.

Tait²² says that the condition resulting when rupture has taken place into the cavity of the broad ligament is most easily diagnosed and easily disposed of. In the act of rupture the ovum is usually destroyed. The case then resolves itself into one of

simple broad-ligament hæmatocele, which is to be left severely alone; it will be absorbed, but the convalescence will be long. These cases should not be molested. Many a man has bitterly regretted having tapped them, because by lessening the pressure the hæmostatic effect of the pressure is lessened and the cyst will refill, and the woman will die as surely from loss of blood as if the hæmorrhage had taken place into the peritoneum. The cases that go wrong are those that are injudiciously interfered with. If the blood is absorbed, then there is an end of the matter. Sometimes, however,—perhaps 1 in 10 of the cases,—the ovum is not killed, the hæmorrhage being smaller; it then goes on developing into a series of conditions. It may go on to the fourth or fifth month and then die. This is a very common ending of the broad-ligament pregnancy. When it dies it may still be absorbed, or it may suppurate, and then you get those extraordinary cases of abscess bursting into the bladder or rectum, or presenting at the umbilicus, with the discharge of foetal bones. The places from which the discharge will take place are those of election in cases of abscess of the broad ligament from any cause. Its cavity is in immediate relation to the anterior wall of the rectum, and therefore the history of the cases is full of instances of discharge of the foetal bones *per rectum*, and less commonly into the bladder. Then, again, the foetus may not die, but may go on to full time, distending the peritoneum; and it is extraordinary to what an extent this distention can be carried. Lastly it may become a lithopædion, or, by rupturing, the peritoneum become an abdominal pregnancy.

In ectopic gestation, the connection between the impregnated ovum and the abnormal location which it has selected is established by a vital adhesion between the chorionic villi and the tissues with which they come in contact, plastic material helping to cement them. This has been demonstrated by Braxton Hicks and Engelmann. As there is here absence of the decidua, the process differs from that found in the uterus, where the serotina performs an active and important part in connecting the ovular and maternal tissues by proliferating-cell activity.

In reviewing the development of the placenta in what Braxton Hicks⁸⁶ terms its extra-peritoneal form he says that, in that rarer termination of tubal gestation where further development

takes place between the layers of the broad ligament, if, instead of the peritoneum rupturing, it remain intact, we may get a continuance of development, as follows:—

If, in the early Fallopian-tube gestation, the foetus lies above the placenta, we may get both it and the placenta developing between the layers of the broad ligament. The placenta in its growth has its downward displacement soon limited by the pelvic muscles, while the foetus may rupture through the peritoneal lamina and lie in the peritoneal cavity free among the intestines. This gives us, therefore, a mixed form of gestation, the foetus being intra-peritoneal and the placenta extra-peritoneal. The placenta thus develops in the broad ligament and pelvic connective tissue, and has, in addition, been displaced downward by the foetus, the amount of displacement being necessarily small. If, however, in an early tubal gestation the foetus lies lower in the tube, the placenta thus occupying the part of the tube covered by peritoneum, we may then get a development between the layers of the broad ligament, as in the previous instance, but with this special difference: the growing foetus pushes up the upper part of the broad ligament with the placenta, and thus displaces the placenta up until it may lie attached to the anterior abdominal wall opposite the level of the lumbar vertebræ. The foetus, and placenta, too, lie, therefore, in extra-peritoneal tissues, the peritoneum being lifted up as the pregnancy goes on. This extra-peritoneal development of extra-uterine gestation is remarkable, but is not unique in pathology, being analogous to the development of a burrowing pelvic abscess or of a papillomatous ovarian cyst.

The most remarkable alteration in placental structure is found, however, in abdominal gestation with the extreme displacement of the placenta. Here the placenta is converted into a mass of organizing blood-clot, with large areas of blood-crystals, great compression and distortion of the villi, entire absence of decidual cells, and no recognizable intervillous sinus system, although the enlargement of the veins in the abdominal wall at the placental site points to some such arrangement existing.

We may therefore say broadly that the development of the placenta in the extra-peritoneal form of extra-uterine gestation is a destructive one,—reducing the placenta practically to compressed villi, where the serotina is destroyed and replaced by blood-crystals

and organizing blood-clot. The least damage is done to the placenta, which, from its more favorable position in the lower part of the tube with the foetus above, is, as we have already explained, displaced least.

In the last place, we have to point out the important bearing of these facts on the life of the foetus. One of the most common terminations of an extra-uterine gestation is to have the foetal bones discharged per rectum, or, in fact, to terminate as a pelvic abscess. Such are evidently extra-peritoneal developments of a Fallopian-tube gestation, where the destructive process going on in the placenta has killed the foetus, and where the proximity of the gestation to bowel unprotected by peritoneum has led to an endosmosis of intestinal gases, or passage of micro-organisms, such as to determine putrid suppuration.

A more favorable termination is where, from the higher position of the foetus, we get its escape into the peritoneal cavity, less displacement of the placenta, and thus less interference with its functions. These are the cases where a full-time foetus can be removed, and where the placenta, from its extra-peritoneal position, is not recognized at the time, and is left undisturbed for ultimate absorption, if away from the bowel. Proximity to bowel may lead to its putrefaction and breaking down.

Treatment.—We cannot do better than give the following conservative rules by Hanks⁴⁶² in the management of ectopic pregnancies: 1. *Electricity.*—If the diagnosis is made during the first three months, and if the symptoms have been only the early or premonitory symptoms of rupture, use electricity. 2. *Laparotomy.*—If the diagnosis is not made until the fourth month, and severe symptoms continue, do laparotomy and remove the sac and contents in the most approved manner. 3. If the diagnosis is made at whatever stage of ectopic pregnancy, and if the symptoms are alarming and undoubtedly due to rupture and loss of blood, do laparotomy at the earliest possible moment consistent with the patient's ability to endure the operation. 4. *Delay a laparotomy until the seventh month.*—If the diagnosis is made after the fifth month, and the symptoms are less and less severe, the foetus undoubtedly is not in the Fallopian tube, and the patient is anxious to bear a living child, and you are prepared to watch the patient, and be ready to meet by laparotomy at a moment's notice any emer-

gency that may arise, then delay is justifiable until the child is viable, in order that laparotomy may be performed with the possibility and probability of saving both mother and child. 5. Operate in the best manner for removal of a dead foetus. When the pregnancy has continued beyond the ninth month, and the foetus is found to be dead, the amount and character of general and local disturbance occasioned by the dead foetus must determine when an abdominal section should be made, other operations performed, and the offending body removed.

Electrical Treatment.—Lusk¹ says that upon the fact that in favorable cases certainty of diagnosis is attainable in the early stages of ectopic pregnancy rests the entire argument as to the validity of the treatment by means of galvanism or the faradic current. He then cites two cases in which there were present the early signs of ectopic pregnancy. In both instances the diagnosis was confirmed by Thomas. In both the faradic current was used: the positive pole externally, the negative pole through the vagina for five minutes, and then through the rectum for the same period. This treatment was employed twice daily. After a couple of days the tumor had become noticeably flaccid, and in a week had shrunk to a small size. Neither have suffered inconvenience, though in each a body of the size of an English walnut may still be felt. One has since given birth to two children without trouble ensuing. These cases are typical, and many similar ones have been reported. The use of the galvanic or faradic current does not call for special skill. The only arguments against the method, except that the results reported carry with them the evidences of ignorance and folly, are that it is likely to cause rupture, and that the retained ovum is liable to excite suppuration. But these eventualities are so rare that they may be left, in case of need, to a subsequent laparotomy. It should be understood that the method under discussion is only available in the first three months, and that no one in this country, as is commonly assumed by foreign writers, advocates electro-puncture.

The argument in favor of the early use of galvanism does not in the slightest degree impair the value of laparotomy, which must always remain our most important therapeutical resource.

Surgical Treatment.—Jewett,¹⁵⁷ in an admirable criticism on the diagnosis and treatment of extra-uterine pregnancy by Strahan,

says that, as to the treatment at the period of primary rupture, there can be no difference of opinion. The importance of early operation is obvious. Every hour of delay diminishes the chance of recovery. The resources of surgery, as Lusk has said, are rarely successful when practiced on the dying. Should collapse be so extreme as to forbid immediate operation when the patient is first seen, something may be done by way of resuscitation before resorting to the knife. Pressure may be made upon the abdominal aorta, as suggested by Playfair, to prevent further hæmorrhage. An intra-venous saline injection may do important service. For this purpose the following solution is recommended: Common salt, 6 grammes ($1\frac{1}{2}$ drachms); liquor potass., 0.07 gramme (1 minim); pure carbonate of potass., 3 grammes (45 grains); water, boiled or distilled, 1000 grammes (1 quart). Heat to 40° C. (104° F.), and pour through a funnel from a height of 1 metre (40 inches). A most potent restorative in conditions of apparent death is nitro-glycerin in hypodermic doses of 10 minims of a 1-per-cent. solution. Atropine should be injected as soon as the effects of nitro-glycerin are apparent.

Cases which survive primary or tubal rupture are, according to Tait, almost without exception, cases of rupture into the folds of the broad ligament.

For the treatment between the primary rupture and the viable age, we have but two alternatives,—expectancy and laparotomy. Should symptoms arise putting the mother's life in danger, incision is safer than any other kind of interference. In the event of "abdominal collapse," as Barnes terms it, or of pelvic abscess, the abdomen should be opened. In the absence of symptoms endangering the mother's life, the case should be let alone till term. The child should have a chance for its life, since while the child lives no interference is demanded in the interest of the mother before the full period.

At the full period of gestation the author gives preference to the primary operation,—laparotomy at term. The outset of labor is the most favorable time for both mother and child. He thinks the statistical comparison of the primary and secondary laparotomy misleading, since the comparison takes no account of the numbers who have died while waiting for the secondary operation. Moreover, the primary has gained most by modern surgical progress.

The incision should be made 2 or 3 inches to the side of the median line, in order to avoid the tube-like process of peritoneum which extends from each side of the fundus uteri to the base of the bladder. The operation may thus be made extra-peritoneal. The history and physical signs will show on which side the fruit-sac lies. An important point in the operation is Tait's method of dealing with the placenta. The cord is cut off close to the placenta, the foetal portion of the placenta emptied of blood as far as possible by careful pressure; the sac is cleansed and washed out with water by means of a siphon trocar, and the stitches drawn tight, with the trocar still in the wound. The water is then pressed out of the sac through the trocar, the trocar taken out, with precautions against admission of air, and the wound totally closed. This method of treating the placenta promises to be a great advance on any previously tried, and Tait says he has tried them all. Yet it is often possible to tie a pedicle with the main vessel in it. In such cases ligation should always be practiced and the placenta removed. When it is much spread out upon various structures, and is so intimately adherent that it can be removed only with great difficulty and hæmorrhage, it is more prudent to leave it. (Breisky's experience leads him to think the total removal of the gestation sac is practicable in all cases.) By hermetically sealing up the placenta in the manner above described, he believes he can in nearly all cases avoid decomposition and suppuration and all further trouble. The placenta is almost surely absorbed in this method of operation. Tait practically converts the primary into a secondary laparotomy, getting the advantages of each and escaping the drawbacks of both. The sac may be re-opened should sepsis develop. Secondary removal of the placenta would probably be both easy and safe after thrombosis of the maternal sinuses. If the operator unfortunately opens the peritoneum, he may stitch the edges of the cyst to the edges of the abdominal wound, and then proceed as in the extra-peritoneal operation. Attachment of the placenta to the abdominal wall over the line of incision would complicate the operation, but this the author believes, despite authorities to the contrary, is a very rare site. After the death of the foetus its early removal is imperative. An expectant policy in these days would be almost criminal. A woman is never free from danger while carrying a dead ectopic foetus. If interstitial pregnancy could be diagnosed before

rupture, the treatment would be dilatation of the cervix, division of the septum, in the wall of the uterus, and evacuation of the pregnant cornu; although Alban Doran²⁵ objects to this treatment, because any meddling with the septum, which may be fairly thick, would be almost certain to cause rupture of the thin and tense upper portion of the sac; nor could the septum be easily reached in many cases.

Vaginal extraction of an ectopic foetus is a more dangerous operation than abdominal section. One thing that conduces to the danger is the fact that the insertion of the placenta is generally pelvic, so that it would be involved in the incision, and, worse than this, the child must be dragged through the highly-vascular placental site.

Medical Treatment.—Gossman²⁴ has used Winckel's morphia treatment successfully for a case of left tubal pregnancy ten weeks advanced. Injections into the tumor through the abdomen of $\frac{1}{2}$ grain of morphine, repeated every fourteen days, resulted in the cessation of symptoms, diminution of the tumor, and recovery. But one attack of pain occurred after the treatment was begun, which is advised by him in very early pregnancies only. In this connection, we would say that before the German Gynæcological Society⁹ Aug. 10 Winckel reported a case of pregnancy of the left tube. At the beginning the sac was the size of a hen's egg. He made an injection of $\frac{1}{2}$ grain of morphine into the foetal sac; the patient remained in bed and had ice placed on her abdomen. At first she felt some pains; at the end of eight days he examined her again and found that the tumor had not diminished in volume. The patient, feeling better, wanted to go out; he made a new injection of $\frac{1}{4}$ grain into the foetal sac, and afterward he found that the tumor had been largely reduced, although only under treatment for the past four weeks. He has treated 9 cases of extra-uterine pregnancy by this method.

OVARIAN GESTATION.

A number of cases of this very rare condition are on record, notably those of Granville, Patenko, Porter, Kammerer, Bandl, and Marimus, who carefully investigated three specimens found in the Pathological Museum of Wurtzburg. Townsend²¹⁶ says that "in ovarian foetation, as is usual, the cyst is void of a peritoneal investment, the walls of the Graafian follicle and the stroma of the ovary

forming the envelope about the developing ovum. The chorion is in intimate relation with the interior of the sac. Subsequent to the fecundation, the Graafian follicle may close and the ovum continue extra-peritoneal, or the ovum may gradually make its way through the opening occasioned by the escape of the Graafian fluid, and thus come to lie eventually within the peritoneal cavity. In either case, rupture of the sac takes place early, though, when the sac-walls are re-inforced by inflammatory adhesions to the peritoneal covering of the adjacent viscera, gestation at full term may be reached."

Patenko⁸⁵_{v.14} discovered a specimen in the Pathologico-Anatomical Museum of St. Petersburg which seems to answer all the requirements of a demonstration. The right ovary was the size of a hen's egg, and contained a cyst with smooth walls filled with serum. In this he found a body, of a yellow color, the size of a hazel-nut, which contained cylindrical and flat bones. The most careful microscopical examination established the fact that the bones were those of a fœtus, and not merely the chance products of a dermoid cyst. The presence of corpora lutea and follicles in the walls of the envelope proved that the body was an ovary. The tube on the corresponding side was nowhere adherent to the sac. The abdominal extremity was closed and there were no traces of fimbriæ.

Paltauf⁸⁶_{v.20} relates a case of ectopic gestation in which there was a sacculated condition of both tubes which communicated with a cyst of ovarian origin. The ovaries were closely united. By means of the ovarian cyst a complete communication was established between the two tubes. In the large central ovarian cyst a clot was formed which contained an embryo corresponding in size to one of forty-eight days' development. The origin of the condition here met with is naturally a matter of speculation.

Zajitzky⁸¹⁷_{No. 51, '88}, ²_{Jan. 18} describes a case of apparent ovarian gestation of six months' duration. On opening the fœtal sac, a very offensive, cinnamon-brown, purulent matter escaped, and an almost black, macerated, and softened female fœtus was extracted. The sac proved to consist of fibrinous membranes adherent to the omentum, bowels, and the right Fallopian tube near its abdominal opening. The fimbriæ were considerably thickened, congested, and covered with false membranes resulting from recent peri-

salpingitis, but the oviduct presented no sign whatever of having been ruptured or dilated. The tube was ligatured about its middle and its external portion removed, with the adherent placenta and sac. The only change found about the oviduct was an inflammatory hypertrophy of the abdominal end of the tube. No clinical symptoms of a tubal rupture had ever been present.

Mann²⁵⁹_{Feb} presented to the Buffalo Pathological Society a specimen of ovarian pregnancy, consisting of uterus, tubes, ovaries, and ligaments. The right ovary was the seat of a cyst some 3 inches in diameter, which he believed to have had its origin in a growing ovum. The cyst evidently sprang directly from ovarian tissue, without such a pedicle as is usually seen in the case of small ovarian tumors. It was strictly a mucous cyst, there not being the slightest tendency to cystic degeneration in the remaining ovarian stroma. The cyst-walls were very thin and pliable, and easily separated into two layers. The specimen unfortunately had no very decided history, being taken from the body of a married woman who died of obscure septic symptoms, the cause not being discoverable. Freeman, who performed the autopsy, stated that, when found, the walls were perfectly transparent, and that a foetus was easily visible through them. Unfortunately, the specimen was frozen and then boiled for some time, and later preserved in some weak alcohol and water. On opening the sac, Mann was disappointed in not finding a foetus, but it contained a placenta, which was lightly attached to the cyst-walls. This placenta was a perfect concavo-convex lens in shape, and under the microscope showed enough to leave no doubt of its being placental tissue. Mann gives, as his reasons for believing the specimen to be one of ovarian gestation, the presence of undoubted placental tissue, the thinness of the sac-walls, and the entire absence of any other cysts in or around the ovary; from the character of the pedicle and from the nature of the fluid contained in the sac resembling exactly amniotic fluid treated with alcohol. The absence of the foetus and cord may be accounted for by the treatment the specimen had received, while the absence of sinuses over the placental site and the delicate attachments of the placenta may be explained by supposing that the death of the child had occurred some time before that of the mother. There was not the slightest possibility of its being a dermoid cyst.

H. T. Byford⁶¹ calls attention to a specimen from the practice of W. H. Byford. It appears to be a case of ovarian pregnancy in which the sac was intact and developed down between the layers of the broad ligament. The tube was entirely separate from the sac and on the opposite side of the ovary.

INTERSTITIAL GESTATION.

In this rare form of pregnancy, *i.e.*, where the ovum develops in the uterine portion of the tube, the sac of the ovum forms a whole with the body of the uterus. Of 26 cases collected by Hecker, all ruptured before the sixth month. Tait says that "so far as known, interstitial pregnancy is uniformly fatal by primary intra-peritoneal rupture before the fifth month." Schwarz,⁶⁵⁰ however, reports a case belonging in this category in which the foetus was expelled into the uterine cavity. The patient was known to be pregnant. Repeated hæmorrhages indicated a threatened abortion. To avoid further dangers, the cervix was dilated with the view to empty the uterus. On examination with the finger, the uterine cavity was found empty, but at the uterine opening of the left tube was a piece of membrane, which was removed. The next day the finger detected membrane at the same site, and beyond a hard body. The uterus began to contract energetically. On the fifth day a foetus was passed by the vagina, the pains ceased, the tumor largely disappeared, and the patient made a good convalescence.

Martin⁵⁹⁸ removed a male foetus (6 months) 33 centimetres long from the left uterine cornu. The patient recovered. Düvelius, who examined the specimen, concluded that the ovum had partially grown into the tube and between the folds of the broad ligament. He thought that rupture did not occur owing to the number of muscular elements in the sac-walls.

J. B. Bolton⁷² writes of an interesting case where a full 4-pound, 8-month foetus was contained in the right horn and tube of the uterus. With the exception of the placenta, which was under the right ostium uterinum, the cavity of the uterus was empty.

Bolton anæsthetized the patient, introduced his hand into the uterus, found the cord, followed it up to the tube, and, finding the breech and the feet presenting, he first disengaged the feet

by steady traction, brought the foetus into the cavity of the uterus, and delivered it by the feet. The foetus had evidently been dead some time.

Williams⁹_{July 27} calls our attention to a similar case, which terminated spontaneously at the fifth month *per vaginam*. The diagnosis was made by introducing the finger into the cavity of the uterus and by abdominal palpation. The case was under observation for many weeks. Lowry⁸⁵_{Sept.} also reports a case which terminated *per vias naturales* after having been seen by two physicians in consultation. After delivery the cavity was washed out twice daily with an antiseptic solution. The child died in a few hours, but the mother made a good recovery. An able criticism of Lowry's reported case says that nearly all gynaecologists deny such a termination as being possible, and the cases that are so reported, they think, are cases of a bicorned uterus in which only one corner was impregnated. It has been clearly proven that a womb may be duplex and yet have very much the same outward feeling as the single organ.

Playfair¹⁰⁶⁰ writes as follows: "How such a cyst is to discharge its contents other than the usual way of bursting into the pelvic cavity I cannot comprehend, particularly when we consider that in what is called interstitial pregnancy the thickest of the cyst-wall is next to the uterine cavity, and that rupture takes place on the remote side. Where the uterus has but one cornu, or where one cornu is in a rudimentary state and pregnancy occurs, we may fall into the error of supposing that it is of the Fallopian tube. Such a cornu may be emptied *per vias naturales*, but the usual termination is by rupture of the sac." Sanger, of Leipzig, calls this form gynatretic pregnancy, and has collected 21 cases which ended fatally in the first six months by rupture and 3 in which a lithopædion formed, 1 of which was successfully operated upon by Koeberlé.

The impregnated cornu has been removed successfully in 2 cases under Salin, of Stockholm, and Sanger, respectively, and unsuccessfully under Litzman, of Kiel. Sanger believes it possible during life to distinguish Fallopian pregnancy from one of the rudimentary cornu, but this is not the general opinion, as, seen after death, certain anatomical points must be relied upon. We must note where the round ligament is given off, it being between

the cyst and the uterus in a Fallopian pregnancy and at the dorsal side of an impregnated cornu. If a Fallopian cyst can discharge itself into the uterus, as claimed, it is strange that an impregnated rudimentary cornu almost universally fails to do so, but ends fatally by rupture.

ABDOMINAL GESTATION (PRIMARY).

Lusk¹_{Oct. 11} says that in the more advanced stages a good many cases of assumed abdominal pregnancy have been placed in evidence. These are divisible into two classes:—

1. Cases where the tubes are reported as intact, but in which there exists a direct communication between the tube upon the affected side and the sac-cavity. Thus, Treub, of Leipzig,³⁹⁸_{B. 15, No. 2} recently reports an instance where, at the autopsy, the adnexa on the right side were normal. The left tube measured 10½ centimetres (4¼ inches), which correspond to the length of the right tube. It was pervious throughout its entire extent. The fimbriated outer end communicated with the sac. There was no apparent distention of the abdominal end of the tube. The sac of the ovum was adherent to the posterior surface of the uterus and of the broad ligament, to a few coils of intestines, to the sigmoid flexure, and to the rectum.

Abdominal pregnancy was assumed by Treub because the tube had its normal length and its natural direction, while the placenta was attached to the posterior sac-wall, which contained no muscular elements even in the vicinity of the tube; but it is much more natural to suppose that a fecundated ovum occupying the infundibulum ruptured the tube-walls at an early period of its growth, and thence continued its development between the folds of the broad ligament. The length of the left tube does not affect the question, as Werth¹⁰⁵¹₇ furnished cases of unmistakable intra-ligamentous development where the same feature was noted.

2. Cases where the tubes are reported as intact and not in communication with the sac. Few of these merit criticism. Lately, however, new interest has been excited as to the possibility of primary abdominal pregnancy by a case operated upon in 1879 by Müller, of Bern, quoted by L. Bruhl.⁹⁵ Extra-uterine and intra-uterine pregnancy existed at the same time. At the eighth month spontaneous expulsion of the intra-uterine foetus took place. The

extra-uterine ovum was removed by laparotomy. Death ensued from hæmorrhage. The post-mortem investigation was conducted by Walker, who, in a carefully-prepared essay, concludes that the case was a typical one of abdominal pregnancy. The tubes and ovaries were in contact with but not adherent to the sac. The latter had started originally from the bottom of the *cul-de-sac* of Douglas, and only in the course of its subsequent development had reached the uterine appendages. The correctness of the author's deductions has not, however, passed unchallenged, most of the recent reviewers regarding the history as indicating a tubal origin.

Schlectendahl reports the discovery of an ovum near the spleen, containing a foetus measuring 15 centimetres (6 inches) in length, in a woman who had died from internal hæmorrhage. The sac was the size of a man's fist and surrounded by adherent intestines. The uterus and tubes appeared normal. The value of this case, as evidence on behalf of abdominal pregnancy, has been denied, but the facts related certainly call for an explanation.

The case of Kellar,⁸¹ referred to by Spiegelberg, in which the body and a large part of the neck of the uterus had been amputated, is a noteworthy instance. Tait has failed to explain this case of abdominal pregnancy, as well as several others reported by men of equally good repute. It is hard to conceive of the impregnated ovum becoming attached to a healthy peritoneum, but we may find explanation for such cases in some of the causes of ectopic pregnancy. Would not inflammation or chronic congestion of the pelvic peritoneum so alter the surface as to allow implantation and development of the ovum? This is as good an hypothesis as that the tube should rupture and the rent heal so thoroughly as not to be discoverable.

MENSTRUATION.

Aveling,⁶ says that the two most recent hypotheses are the uterine and Fallopian, propagated by Johnstone and Tait (ANNUAL, vol. iv, p. 53, 1888). In opposition to these we have the ovarian theory, which is that menstruation depends on the existence of an ovary, and the facts upon which this belief rests are:—

1. When the ovaries are congenitally absent menstruation is also wanting.

2. When the ovaries are removed early in life the same result is apparent.

3. When the ovaries are removed after puberty menstruation generally ceases.

4. All the secondary sexual characters in the female are dominated by the ovary, and menstruation is one of these.

The prime and all-important act of the sexual apparatus is the production of ova in the female and spermatozoa in the male. The ovaries and testicles furnish the generative elements essential to reproduction. The rest of the reproductive organs and their functions are subservient to menstruation; nidation, the sexual appetite, the growth of hair on the face and pubes, the change of voice, the development of the pelvis and breasts, etc., are all dependent upon the ovary or the testicles for their existence, and are not essential to the acts of impregnation and gestation.

Menstruation, without doubt, appears during the period of life when the ovarian function of ovulation is most active, but it has not been proved that the menstrual flow and the escape of the ovum have any causal relation determining their occurrence at the same time.

Johnstone maintains that the uterus is an independent organ, and performs its menstrual function without any aid from the appendages, but that it is assisted by its own plexus of nerves situated in the cornua.

The reasons why Tait believes the Fallopian tubes to be the starting-point of menstruation are:—

1. Pain when the tubes are occluded.
2. The first appearance of menstrual fluid in the tubes.
3. The continuance of menstruation after removal of the ovaries.
4. The arrest of menstruation after removal of the tubes.

The conclusions he draws from these reasons are that the old statement that the ovaries rule the function of menstruation is not based on fact, and that the tubes have more to do with menstruation than the ovaries.

Campbell⁶ has no doubt that the menstrual rhythm is initiated by a nervous rhythm dependent upon nervous structure. Just as there is a rhythmically-pulsating respiratory and cardiac

centre, so there is a rhythmically-pulsating sexual centre which furnishes fibres both to the ovaries and uterus, those of the latter passing, for the most part, along the Fallopian tubes, but some few to the uterus directly. This hypothesis explains all the facts of the case:—

1. That the periodic flow continues after the removal of the ovaries.
2. That it generally ceases when the tubes have been removed.
3. That in rare cases it continues after both the ovaries and tubes have been removed.

Campbell⁶_{V.S., p. 1004, '98} also believes that ovulation is an essential part of the menstrual rhythm. In opposition to this, Tait⁶_{ibid.} says that, if this were so, we should have in either post-mortem or ante-mortem examinations of the ovaries a definite number of ripe, ripening, or decadent follicles, proportionate to the methodical order of the performance of menstruation. In a statistical account of all the available information which Tait's operations have enabled him to tabulate, he says that it is clearly shown that the proportion of ripe ova to menstrual periods does not give more than two or three ripe ova in a year.

Peritonitis following Ovarian Apoplexy at the Menstrual Period.—Fordyce¹_{Feb. 10} reports 2 fatal cases of this interesting condition from peritonitis following the sudden suppression of menstruation. In 1 of Fordyce's cases, examined after death, an abundant deposit of fibrino-purulent material was seen covering all the abdominal viscera and matting the coils of small intestines together. The deposit extended to the diaphragm, but was most abundant in the lower portion of the pelvis. No tubercles and no abnormal condition of the appendix vermiformis were seen. The intestines were normal; no ulcerations were found. The liver showed passive congestion, but was otherwise normal; the spleen was normal, and the kidneys showed cloudy swelling. At the juncture of the right ovary and Fallopian tube a blood extravasation the size of a cherry was seen. The blood seemed to have spread between the layers of the broad ligament for a short distance. No pus was found. On opening the ovary longitudinally the cut surface was intensely red and full of tortuous vessels. A *corpus hæmorrhagicum* the size of a hazel-nut was

seen. The left tube and ovary were normal, as was also the uterus, although blood-stained mucus covered its lining membrane, such as would appear after a recent menstruation. The vagina was normal; the hymen was present. In 2 autopsies by H. P. Loomis,¹ general peritonitis was found in both, which seemed to have originated in the pelvis; but in neither of his cases was there an ovarian blood-cyst, nor any cause aside from the sudden suppression of the menstrual flow to account for the fatal peritonitis. Schroeder¹⁰⁴⁶ says that rupture of a Graafian follicle may, in exceptional cases, be followed by so profuse a hæmorrhage that it can (1) prove directly fatal; (2) cause a peritonitis which may terminate fatally; (3) produce a capsulated blood-clot in the peritoneal cavity; (4) form a retro-uterine hæmatocele. Graily Hewitt¹⁰⁴⁷ says that if a Graafian follicle does not rupture, as it should, into the Fallopian tube, hæmorrhage takes place within it; it enlarges from continuous bleeding and ruptures. Should the bleeding be profuse an intra-peritoneal hæmatocele would be produced. Such an intra-peritoneal hæmorrhage seldom causes a fatal peritonitis. Olshausen¹⁰⁴⁸ divides ovarian apoplexy into two varieties: (a) that which occurs in the stroma of the organ; (b) that which takes place in the follicle, which is by far the more frequent. It occurs, in the great majority of cases, at the time of the menstrual congestion, as a pathological exaggeration of the normal menstrual hyperæmia. Winckel gives, as causes of such follicular hæmorrhages, general diseases impairing the quality of the blood, congestions of the abdominal organs, heart failure, phosphorus poisoning, extensive burns, etc. As a rule, such blood-cysts do not rupture, but terminate in an absorption of their contents.

Pelvic Pain due to Malformed Genitals.—Düvelius³¹⁷ reports an interesting case of pelvic pain due to malformed genitals, operated upon by A. Martin, in a girl aged 19. She had never menstruated, but from the age of 15 had been subject, at the menstrual epochs, to headaches which lasted several days. Facial pains further complicated the case. The vulva was found to be closed and the vagina absent. The ovaries were of normal size, as were the tubes. Each tube sprang from a tough body, representing a corner of the rudimentary uterus, which was unconnected excepting by a fold of peritoneum, as is usual in such cases. The ovaries bore numerous cicatrices and one fresh *corpus*

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GOODELL.

[Pelvic Pain due to
Malformed Genitals.

luteum. The patient has remained free from pain since the operation.

DISEASES OF THE VAGINA AND EXTERNAL GENITALS.

By W. H. PARISH, M.D.,

AND

J. M. BALDY, M.D.,

PHILADELPHIA.

CLITORIS.

Injuries.—Bókai¹³² reports the case of a young girl, who, for the purpose of masturbation, ligated the clitoris so tightly with a thin thread that the organ swelled up to the size of a hazel-nut. It remained in this condition for fourteen days without sloughing, after which time the constricting band was loosened and the mass subsequently amputated.

Sarcoma.—Lafleur²³² reports a case of melanotic sarcoma of the clitoris in a woman 80 years old. The patient had suffered from severe periodic hæmorrhages from the affected part. The period of growth was three years. Amputation was followed by a good recovery. Nothing is said as to the permanent cure.

NYMPHOMANIA.

Wernicke¹⁰⁹ reports a case of the above disease caused by the entrance from the rectum into the vagina of a parasitic larva, known as *anthomya canicularis*, or screw-worm. Irrigation of the vagina brought away the larva, and the sexual excitation subsided.

ERETHISM.

Coe²⁷ reports the case of a patient who suffered from this trouble before marriage, and who became progressively worse after marriage. At first the seat of irritation was in the clitoris, and later was transferred to different points. The sensations were primarily pleasurable, but soon became painful. The ovaries were removed without avail. Coe considers that the disease, in cases of extreme sexual irritation, lies in the nervous system, and that removal of the ovaries or clitoris is not indicated. This opinion

of non-operative interference is also held, in the discussion of the paper by Wylie, Nicolls, Grandin, and Hanks, and fully agrees with our own experience. Dudley, however, contends for early removal of the clitoris, believing that the origin of the disease lies in this organ.

DYSPAREUNIA.

Mundé¹⁰¹_{June} says that painful coition is due to a variety of causes, such as hypersensitive carunculæ, inflammation of vaginal orifice, leucorrhœal discharges, lacerated and tender cervix and perinæum, inflamed and congested tubes and ovaries, chronic peritonitis or cellulitis, and uterine displacements. To effect a cure, the cause must be searched for and treated. In the case of hypersensitive carunculæ he recommends excision of the offending parts. We have, however, had this fail to cure patients, and too much should not be expected from it.

HYMEN.

Sym, Milne Murray, and Ballantyne³⁶_{Sept.} each report cases of annular hymen. In all these cases the consummation of marriage proved impossible, and it became necessary to administer the anæsthetic, and with scissors and fingers break down the tough and thickened membrane. The hæmorrhage proved slight and was easily controlled by tampons. This is not always the case, however, some cases having been reported in which the hæmorrhage has proven exceedingly troublesome.

Atresia.—Papers on this subject are presented by F. Gross,¹⁰⁹⁰_{Sept.} Gustav Braun,⁸_{Nov. 28} E. A. Benton,¹⁰⁶_{Sept.} and O. P. Owen.²_{Sept. 21} The cases are of congenital origin. The symptoms usually noted were: a non-appearance of the menstrual flow at the time it should appear; the beginning phenomena of menstruation; a continuation of this condition from month to month, with gradual access of pain and bearing-down feelings; finally, an epigastric tumor appears and also often a vaginal one, with rectal and vesical pressure symptoms. As a rule, there should be no difficulty in diagnosing the cases. The treatment consists in incision of the obstructing membrane, with gradual withdrawal of the tarry contents. The vagina should be irrigated with an antiseptic solution, and the patient kept in bed for some days. In some cases ergot has been administered. The results are complete relief of most of the symptoms and the onset of normal menstruation.

Injuries.—Mundé²⁷ reports 3 very interesting cases of this trouble, 2 occurring in his own practice and the third in the practice of a French physician. In his own the hymen was torn bodily away from its attachment to the posterior right and upper border of the vaginal orifice, and hung loosely to the left upper margin of the vestibule. The central aperture was intact and admitted the index finger. Coition and parturition caused no symptoms. In the case reported by the French physician the hymen had to be removed on account of the pain caused during coition.

Dagenais²² records a case of a patient who lost large quantities of blood following the rupture of the hymen during the first night of wedded life. When he first saw her she had a death-like pallor and a very weak pulse. He controlled the bleeding by the application of acetate of lead and a tampon.

VULVA.

Kraurosis Vulvæ.—Ohmann-Dumesnil⁸² gives us a very interesting paper on this peculiar disease. He reports 10 cases which have come under his observation. Six of these were in the practice of other physicians and 4 in his own. Some of the cases were married, others not, and some were prostitutes. Some had children and some not. Some had gonorrhœa or syphilis and were suffering from leucorrhœa, whereas others were not so affected. Age seemed to play no part. Pruritus existed in some and not in others, and the peculiar opaline plaques were not found in all. On the whole, but one constant factor was present, *i.e.*, the peculiar atrophic condition. Breisky first described the disease in 1885. Janowsky in 1888 reported 6 cases very similar to those above. Therapeutic aid was of no avail.

Noma.—Queely⁶ reports a case of this rare disease. The patient, a girl 9 years old, felt an irritation about the vulva for a few days. She had just recovered from an attack of measles. In three days both labia became very much enlarged and of a deep-red color, and several ulcers appeared on them. By the fifth day the glands in the right groin were enlarged and inflamed, abdomen swollen, ulcerations larger, and fresh ones appearing on fourchette and perinæum; the buttocks were covered with a rash. The vulvar opening was continually closed by discharge and the labia were gangrenous. The bowels were opened, dark-green matter being

passed, which was very offensive. Patient was delirious. On the eighteenth day she was convalescent. Treatment consisted of local cleanliness and antiseptic washes; internally she had iron, quinine, and abundance of strong nourishing food and wine.

Schimmelbusch,⁹⁹ reports a similar case. His patient was a 5-year-old girl, who had just recovered from a severe attack of typhoid fever. She died five days after entering the hospital.

Vulvo-Vaginal Glands.—Róna, of Buda-Pesth, Hungary, collaborator, divides inflammations of Bartholini's glands into (1) simple catarrh of the duct of the gland; (2) gonorrhœal inflammations of the duct of the gland, with gonococci in the secretion; (3) idiopathic abscess of the gland; (4) gonorrhœal inflammation of the duct, with abscess of the gland.

He reports 2 cases of the third variety. The first case was a girl, 14 years old, in whom the hymen was perfect, and who had no leucorrhœal discharge. The second case occurred in a young woman married only four days. The husband was carefully examined and found to be perfectly healthy. The patient had no leucorrhœa, and none appeared after months of careful observation.

Bonnet¹⁸² writes that cysts of the vulvo-vaginal glands arise from an occlusion, obstruction, or adhesion of the duct, produced by catarrh, cicatrices, cancerous neoplasms, etc. The disease is usually one-sided. The contents may become purulent if a gonorrhœic vulvitis complicates it, or traumatism may induce this change. Bonnet thinks the only method of complete cure lies in extirpation. He thinks that most cases of abscess are dependent on an acute or chronic vulvitis. He also advises complete extirpation in the abscesses. We have ourselves always obtained satisfactory results in these abscesses by free incision and drainage.

Chunn¹⁰⁴ reports 2 cases of what he calls chronic inflammation of these glands. The patients had had gonorrhœa. They complained of a mucous discharge. This appeared at irregular intervals and was of a viscid, glairy nature. An examination showed a hard, nodular swelling at the site of the gland. The swellings were perforated by several small openings. The glands were dissected out. B. B. Browne¹⁰⁴ records the case of a patient suffering with an abscess of this gland in whom, two months after rupture and discharge, there appeared a recto-vulvar fistula at the site of the old abscess.

Injuries.—Hæmatoma, in both the puerperal and non-
puerperal state, are probably more common than is generally sup-
posed. In the puerperal state the mortality, according to
Winckel, Scanzoni, and others, is about 18 per cent.; but this was
in the pre-antiseptic period. Wright²⁸² reports 2 cases, one of the
vagina, the other of the vulva; both recovered. We are told by
Barnes and Matthews Duncan that small submucous extrava-
sations of blood along the genital tract during parturition are
very common, if not practically universal. The more serious
lesions differ probably in degree rather than in kind. In a general
way they are all caused by pressure. Varicose veins do not par-
ticularly predispose toward the formation of these thrombi. In
both of Wright's cases the veins were perfectly normal. "The
treatment depends on circumstances,—whether the tumor is small
or large, whether it appears before or after the completion of labor.
If they do not obstruct labor, or do not threaten to cause sloughs,
they should be left alone to be absorbed. If they obstruct labor,
threaten sloughs, or will not absorb, they should be freely incised,
emptied of the clots, drained, kept clean, and allowed gradually to
close."

Hæmatoma of the non-*puerperal* state are the result of falls,
blows, kicks, awkward coition, etc. Page⁷⁹⁰ reports 3 such cases.
"The general symptoms are pain, more or less collapse, vomiting,
and difficulty in micturition. If the effusions are small, cold
applications and pressure should be used; if large, free incision
and drainage should be adopted. These cases all recover after
prolonged illness."

Our own experience would lead us to always freely incise
hæmatomata if of any considerable size, more especially in the
non-*puerperal* state. In the *puerperal* state, where incised, care
must be taken that infection of the wound does not occur.

Injuries of a similar character to those causing hæmatomata
at times occur, in which the skin or mucous membrane becomes
lacerated and the hæmorrhage is turned from a concealed to
an open one. Olenin⁹⁶ reports 2 cases. One woman slid off a
hay-stack and a rake-handle penetrated the vagina. The second
patient, a young girl, was dealt a blow from behind by the horn
of a cow. The wound included the hymen, posterior commissure,
perinæum, and outer sphincter. M. P. Root, of Madura, South

India, corresponding editor, reports another case of injury by a cow, in which the wound extended from the labia to the pubis. Flinterman²³ adds 3 cases to the list. The injury in all these was in the vestibule. In 2 he was forced to put in three stitches each. Both fell from a chair. The third case fell astride of a barrel. Drzymalik,⁸ on the other hand, reports a case of injury to the vestibule, where the patient bled to death before it was known what was the matter with her. The cause of the injury was not discovered. We have ourselves observed a case similar to this, caused by the woman unconsciously sitting on the back of a child's chair. The patient fainted from the loss of blood. The wound was not more than 1 centimetre (0.39 inch) in length. Occasionally, at first coition, we have the penis penetrating the recto-vaginal septum. A patient of Springfield⁵ met with this accident the night following her marriage, and the next morning was passing flatus and fæces through the vulva. The fistula penetrated the floor of the fossa navicularis into the rectum. This is the fifth case of the kind on record.

Cysts of the Labia Minora.—B. B. Browne¹⁰⁴ relates 2 such cases. He says they are very rarely observed. Both were on the right side, about the size of a hen's egg, and freely movable. Both contained fluid of a thick gelatinous character. The lining membrane of the cysts was serous. The cavity extended in the direction of the round ligament toward the cornu of the uterus. One of them he opened several times, and, as it refilled, he finally took out part of the cyst-wall and injected iodine, producing a cure. The other he could not treat so radically. After opening it several times, he at length cut out a part of its wall, including both serous and mucous surface, and it has not yet refilled. The cysts followed the round ligament above, but not below. Both patients were colored women. J. R. Uhler¹⁰⁴ enucleated a tumor of the labium minus in a Jewess. It was hard and contained a sort of serous fluid, with some blood, and in one corner was granulating tissue.

Fibroid Tumors of Vulva.—G. W. Johnston¹⁰⁴ removed a hard, rounded, nodular tumor, the size of a large hickory-nut, from the right labium. It was attached by a short, thick pedicle. It increased in size during two pregnancies, but became smaller afterward. It caused no symptoms. On examination it proved to be a fibro-myoma, the fibrous tissue predominating.

Rutherford⁴⁹ reports a fibroma of the nymphæ the size of a walnut. He dissected it out completely. There was free hæmorrhage. Fenwick⁴⁹ mentions the case of a patient who had fibroma of the vulva which weighed between 2 and 3 pounds (1 kilogramme and 1 kilogramme 500 grammes), and came down to the patient's knees. Microscopical section showed it to be true fibroma.

Elephantiasis.—Alexander¹⁸⁷ reports 3 cases of death from this disease, as well as a number of cases in which a cure was obtained. He calls attention to the fact that ulceration and inflammation are the constant companions and the probable causes of all the cases of elephantiasis he has seen. In some cases a chronic labial abscess produces a simple hypertrophy that gradually disappears from the time a free opening is made, but this differs from the ulcerative cases. In most cases the ulcer is on the inner side of the nymphæ, sometimes all around the vaginal opening, and does not tend to heal. Epithelial cancer and rodent ulcer are easily distinguishable from this class of cases by the new growths of the epithelium and the nature of the rodent cancer. The characteristic features of the disease are persistence, indolence, and simple infiltration of the vulvar structures. It has always occurred, in his experience, in syphilitic subjects and is dependent on the syphilitic disease. The treatment consists in removal by surgical means. We are not disposed to agree with Alexander as to the ease of differential diagnosis. Our experience leads us to the belief that at times a differential (clinical) diagnosis of the various ulcerations and hypertrophies of this region is extremely difficult, and the treatment at times becomes, in reality, experimental.

Lupus.—G. S. Case²⁸⁴ reports the case of a woman with a sore on the vulva. He was uncertain whether it was lupus or epithelioma. It had been indurated, but was now soft, and discharged an ichorous fluid. Lewers² mentions the case of a woman in whom there was the history of gonorrhœa, but not of syphilis. A growth appeared on the vulva, which became swollen. On admission to the hospital, a spherical, pendulous lump, whitish and smooth on its inner surface, brownish and nodular on its outer aspect, was found growing from the left labium minus, prepuce of clitoris, and part of the right inner labium. The labia majora were swollen, not pitting on pressure, and were studded externally by small, warty prominences; also seen on the perinæum and mons

veneris. The disease was removed, but four months later a lump the size of an almond was pinched up and dissected out of the right side of the vulva. William Duncan considered this case to be one of hypertrophic syphilide, and it seems to us that the history strongly supports this assertion.

Sarcoma.—R. W. Taylor²⁴⁶_{July} reports a case of primary melanosarcoma of the vulva, which is one of the rarest forms of malignant new growths of these parts. At the age of 60 years a slight smarting sensation and a bluish streak between the labia had been noticed, followed by a small, round tumor near the meatus, and, later on, by a pea-sized tumor on the opposite side of the meatus. These were excised, but returned two months later. Again excision was performed, when, one month later, another tumor was observed on the right side of the meatus, and extended along the margin of the introitus vaginæ. At the end of eight months it measured $1\frac{1}{2}$ inches (0.038 metre) by $1\frac{1}{4}$ inches (0.032 metre). The growth was firmly adherent to the mucous membrane; there were no inflammatory complications and no discharge. In the corresponding groin hyperplastic ganglia were matted together and firmly adherent to the deep fibrous tissue. The growth was removed, but the patient died thirteen months after the operation and three months after the invasion. Hypodermics of arsenic in full and increasing doses, administered early in the disease, are recommended as the best treatment. However, the only treatment of sarcoma which promises any good whatever is the knife.

Primary Epithelioma.—Mundé²⁷_{Nov} says that carcinoma of the vulva occurs about once in 35 to 40 cases of cancer of the female sexual organs. Epithelioma is by far the most frequent variety and remains local a long while, not infecting the inguinal glands until quite late. When it involves only the labia or mons veneris it can usually be radically removed without difficulty, but when it has spread to the urethra it may be necessary to remove more or less of that canal to reach sound tissue and contraction of the urethra; or, if the neck of the bladder has been injured, incontinence of urine may ensue. In the matter of diagnosis, the microscope will easily settle the question. He reports a case where he excised the disease, and the patient three months after remained well as far as he knew.

A. Ballenghien²²⁰_{July 20} reports a case of this disease, and says that

it is of much more frequent occurrence than is imagined. He had seen 12 cases in his service in four months; Maurel had reported 35 cases in 1888. His own cases arose on the right labia majora, the usual seat being the left labia. The origin of his case was not in the Bartholini gland, as is usual. Lancial, ²²⁰ on the other hand, seems to think it more rare. He says that in eight years, Billroth, out of 548 cases of cancer, found primary epithelioma of the vulva only eight times. Rupprecht had only seen 7 cases. The diagnosis was not difficult; it resembles much the cancer of smokers. The proper treatment is excision. Rupprecht and Volkmann recommend that, even if the inguinal glands are not apparently involved, they should be explored with the knife and completely removed if found in even a doubtful condition. This is done in the axilla in cases of cancer of the breast, and the same principle holds good here. Lancial is inclined to believe with Verneuil in the theory of a bacterial origin. He thinks that the microbe may enter into the tissues at the site of an old abscess or wound, and by slow and prolonged irritation ultimately produce these neoplasms. The case he reports had had an abscess twenty-seven years preceding the epithelioma, and he thinks the microbes then entered the tissues and so set up the disease.

This seems to us, in the case of Lancial, at least, to be rather extreme, and they are few who will not view this theory with skepticism.

Syphiloma.—J. W. Hyde ²⁴⁵ contributes an exceedingly valuable paper to this subject, and one which bears strongly on what we have had to say about diagnosis in Alexander's case of elephantiasis and Lewer's case of lupus. Hyde portrays the symptoms of gummatous involvement of the vulva, whether partial or complete. Syphiloma of the vulva is rarely seen, according to Hyde, in its earliest manifestations, because of its painless and often insignificant beginnings. When first recognized it is usually a deep-set, well- or ill- defined, firm, bean- to nut- sized infiltration of the submucous or subcutaneous tissues. As a rule, the inguinal glands are quite unaffected. Some such change as this always precedes the ulceration. It is noted that the neoplasm is commonly first developed at a given point in the vulva, and does not reach this point by extension from the internal generative tract; next, that its first beginnings are not observed in the groin, the inner surface

of the thigh, or the lower belly, whence it has spread to the vulva; lastly, that if a line be drawn at right angles to and bisecting the axis of the vulvar cleft, the initial gumma will usually be discovered above rather than below this imaginary line; and its extension later will be generally downward toward the perinæum rather than upward over the pubes. The disease may spread from a small ulcerated patch to gigantic ulcerations, invading all the vulvar tissues and extending into the perinæum, thighs, etc. The patients may be pallid, cachectic, and emaciated, or many of them are well-nourished, wholesome-looking women, giving no clue whatever in external appearance to the degree of disease actually present in the vulva. They are also, as a rule, entirely free from any other evidences of syphilitic infection. In very few cases can a past history of syphilis be obtained.

Distinguished as many gynæcological writers are in their own branch, it is yet true that few physicians, without a special training for the work, are competent to distinguish syphilis in a single symptom or to identify its operations in an isolated scar. It would be difficult to name a single gynæcological author who has seriously discussed the diagnostic question from the point of view of the classical distinction between so-called secondary and tertiary phases of this multiform disease. The observers and writers identified with this subject seem to be, for the most part, quite unconscious of the clinical fact that a woman with a gummatous lesion of the vulva may not only not betray any other symptoms of syphilis, but may exhibit all the other evidences of sound health. And so, one distinguished writer looks to find something suggestive in the edges of the ulceration displayed in a certain case, and, failing in this, is in doubt respecting the nature of the malady because there is not conformity to the type of syphilitic ulceration in general and no constitutional symptoms of the disease. How, then, are many of these syphilitic lesions designated and reported? Most conspicuously among the many diseases may be named *lupus vulgaris*. Since the date of Huguier's early contributions to this theme, it is probable that more cases of syphilis have been recorded under the several names descriptive of *lupus* than under all others together; but when the clinical statistics of *lupus* are consulted the antecedent improbability of its invasion of the genital region is apparent at a glance. There is not a dermatological treatise

in any language devoting even a page to lupus of the genital region. Hebra distinctly asserted that lupus is never of primary occurrence in this region of the body, its lesions, when here present, having invariably invaded the genital organs by extension from the thigh; and yet in 48 cases, collected by Peckham, a crural origin and subsequent extension to the vulva is not once recorded. In 1 there is a record of simultaneous disease of the left thigh and right labium; in 2 others there was ulceration of the groin resulting from bursting of abscesses in the inguinal glands; in as many more, as might be anticipated, isolated groups of pustules or nodules over the buttocks,—the rare concurrent symptoms, in fact, of tertiary syphilis. In not a single one of all these reported cases does an author describe facial lesions of lupus vulgaris. These statistics will be further sought in vain for the discovery of any author who has taken the trouble to even record the fact that, although describing lupus of the genital region, a singular exception to the rule was seen in this, that no facial lesions of that disease were present. In a few instances, as might be anticipated *à priori*, a facial acne or acne rosacea, was noticed as co-existing with the vulvar symptoms. Lupus is a malady of childhood, and of exceeding slow growth and termination. The majority of patients displaying the lesions of so-called esthiomene of the vulva are women who have sustained relations with the other sex, and a surprisingly large proportion of them have antecedent syphilitic histories, the termination of those ending fatally being relatively quick. It would be preposterous to claim that all these cases reported as lupus are syphilitic in character, but very many of them are clearly of such origin.

If lupus vulgaris is a rare affection of the genital region, with still greater emphasis may this rarity be affirmed of tuberculosis. Tuberculosis of the vulva is, indeed, a pathological curiosity. Zweifel was unable to discover, in the literature of the subject, a single well-authenticated case, and Chiari was only able to report one case. True elephantiasis of the vulva is another exceedingly rare affection, and many of the cases so reported are plainly syphilitic. Primary sarcoma of the vulva, still rarer than any of the lesions named above, may be said not to figure in the literature of medicine. Primary epithelioma is much more common, and a mistake in diagnosis is not likely to be made.

The experience of Hyde, as given above, coincides so exactly with our own that we have quoted his article at length. In an experience covering four or five years in large gynæcological dispensaries we have yet to see our first patient who was suffering from undoubted vulvar lesions of lupus, tuberculosis, elephantiasis, or sarcoma. Most of the cases of these diseases, reported from time to time, have seemed to us to be wanting in a conclusive history, and many of them are clearly syphilitic.

Angioma of the Meatus Urinarius.—Petit⁷_{Nov. 20} gives the account of a tumor developing from the meatus of the urethra in a woman 59 years old. The development was sudden. On account of fatigues and repeated strainings the tumor protruded from the meatus, carrying with it the subjacent mucous tissue, thus forming a pedicle for itself. Urethral polyps, hæmorrhoids, and epithelioma were easily excluded by the appearance and history. The tumor was clipped off with scissors; no cauterization was needed.

Hernia of the Labium.—Henry Morris²²_{Aug.} noticed in a woman aged 40 years a swelling in the labium which had existed for five years. He diagnosed an omental hernia, and verified his diagnosis by cutting down and performing a radical operation in the usual manner. Monteuuis²²⁰_{June 20} speaks of hernia into the labia majora as being very rare. He reports one case of a woman 40 years of age. The mass had followed the round ligament through the canal of Nück and formed a large labial tumor. The hernia was easily reduced and held in place by a bandage.

Cysts of the Inguinal Canal.—Thiéry⁶⁴⁸_{July 24} mentions a patient in whom he found a movable tumor at the entrance to the inguinal canal, the pedicle of which could be traced into the canal. The tumor was hard and irreducible. He removed the tumor, and found it to be cystic and divided into two unequal parts. A microscopical examination proved it to be a fibro-myoma of the round ligament, with an epithelial lining. Broca thought it might be a cyst of the canal of Nück itself.

Hydrocele of the Round Ligament.—Smital,⁸_{Oct. 11} after some preliminary remarks on hydrocele in the female in general, relates the history of a case which came under observation in the clinic of Wölfler in Gratz. The patient was 35 years old. Six years before a lump as big as a nut had appeared in the right inguinal region. This lump was irreducible and remained of the original size until

February, 1889. At this time she had her first labor, and passed through it without any enlargement or inflammation of the tumor. In a short time, however, it began to grow, and continued to do so until it reached the size of a goose-egg. In June a small lump appeared in the left inguinal region, and symptoms of intestinal strangulation appeared. She was brought to the hospital in a carriage. After some vomiting, the left tumor, which was painful, was reduced and wind passed by the bowel. An operation was made next day. The tumor in the right labium was found to be a cyst, connected with the round ligament. It was shelled out and the surface cauterized. It was 6 centimetres (2.3 inches) long and was pear-shaped. The differential diagnosis from intestine generally rests on the shape and the fact that the gastro-intestinal canal is pervious. In 42 collected cases 25 were cured by operation. Some treated by puncture were only improved. Three patients died: 1 after operation, 2 without operation. Smittal thinks the proper treatment to be complete excision of the cyst, antiseptic irrigation, and drainage: his case recovered.

Vulvitis.—Berger⁷⁸⁰ contributes an interesting paper to vulvitis complicated by cystitis. Bouchert says, "generally, leucorrhœa of children comes from the vulva and labia, and not from the vagina and uterus, as in adults." Berger thinks this statement too absolute. It is never uterine, but may be vulvar or vaginal, and usually is so. The labia majora and minora are first affected by the inflammation; then the hymen, and, finally, the vaginal mucous membrane becomes involved. The lower part of the vagina only is affected. Most cases are non-specific, but simple catarrhal inflammation of scrofulous origin. The vulvitis may further give rise to inguinal adenitis or true buboes. The bladder is at all times affected when the inflammation has been neglected and is severe. He reports the case of a child 6 years of age to support this assertion. Cystitis is rare in children, and Berger had not seen in his private practice or in the hospital for children, in 1888, a single case. He could find this complication mentioned but once.¹¹¹¹ Holmes had seen infantile leucorrhœa complicated by troublesome irritation inside of the bladder. Berger asks if the same treatment is to be adopted as in adults, and concludes that we will know more about that when more cases have been observed.

Pousson⁷⁸⁰ supports these observations of Berger by a case

occurring in his own practice. The patient was a strumous girl of 14 years. For some time there had exuded from the genitals a sero-purulent fluid. The parts were tumefied and red, and covered with yellowish crusts. There was a desire to micturate every four or five minutes. The urine presented characteristic alterations. The patient failed to return, and what was the result of treatment could not be determined. It would have been interesting to observe whether the cystitis subsided simultaneously with the vulvitis or not. Personally, we have never observed true cystitis accompanying vulvitis in young girls, but on a number of occasions we have observed bladder irritation with frequent micturition. This was always subsided with the cure of the vulvitis.

Atresia of the Nymphæ.—J. R. Logan³⁸ reports an interesting case of atresia of the nymphæ with an apparent hereditary tendency. The patient was a 5-year-old girl. When the labia majora were separated it seemed as if the skin of the one passed over and became continuous with the skin of the other, obliterating the entrance to the vagina, and looking as if the perinæum had been continued forward up to the meatus urinarius, simulating the male perinæum. A small aperture just behind the meatus was found, and the membrane split down to the true perinæum. An older sister at birth had shown an incomplete adhesion of the nymphæ, which were subsequently torn apart while being washed. The child's aunt was born with complete adhesion of the nymphæ.

PERINÆUM.

Lacerations.—Renewed interest has been awakened upon the subject of operations for the repair of injuries to the female perinæum, and an unusually large amount of literature has been contributed to the subject. The profession seems to be divided pretty sharply into two camps, those advocating some of the old denuding operations, or modifications thereof, and those upholding the so-called Tait or flap-splitting operation.

Marcy,²⁷ Jan. King,⁵⁹ June 1 Wyman,²³⁴ Feb. Da Costa,⁹ Oct. 19 Owen,¹³⁵ Jan. Munn,¹⁸⁵ Oct. Carpenter,⁵⁹ Nov. 16 all declare for some one of the older methods.

Parvin,¹⁹ June Martin,⁴ Feb. 11 Holford Walker,³⁹ Mar. 16 Macphatter,²⁷ Nov. Podsewitsch,³¹⁷ Oct. 28 Mundé,²⁷ July Fancourt Barnes,⁴⁹ Aug. Sängner,³¹⁷ July 27 Rüter,¹¹⁶ Sept. Uspensky,¹⁵⁴ June Warder,²⁷ Oct. are equally emphatic in favor of the flap-splitting operation.

Of the former, Marcy, King, and Wyman claim originality for their operations, but on close inspection they are found to consist of parts of two or more well-known procedures. The introduction of the sutures in Marcy's operation is of his own invention. The dissection of the flap is very similar to that of Goodell's. Wyman's operation is simply a reproduction of the operation described by Goodell.¹¹¹⁰ The rest of the denuding operations described, and for which nothing particularly new is claimed, are reproductions or modifications of old procedures.

In fact, there has been no advance made during the past year in this direction, most of the interest having been centred in the flap-splitting operations. Like everything new and brilliant, this operation has taken a wonderful hold on the profession, and has been extolled to the skies. There is, however, a slight reaction from the extreme to which it has been carried, and critics are not wanting. King objects in that (1) it only restores the floor and lower part of the perineal body. 2. It does not correct the rectocele. 3. It does not relieve the dragging on the posterior wall of the vagina. 4. It does not form the upper portion of the perineal body anew and give the needed vaginal support to the prolapsed uterus. 5. It does not remove the old cicatrices. Amongst other critics may be mentioned Carpenter,⁵⁹ J. Price,²⁷ Hoffman.²⁷

Fancourt Barnes is one of its most ardent advocates, and says, of the denuding operations, that "the old plan of paring away the mucous membrane of the vagina is most unscientific, as each time the operation fails the patient loses some vaginal tissue, until, in some cases I have seen, most of the posterior vaginal wall has disappeared. . . . I feel sure that medical men who have only seen the results of the old operation naturally hesitate to advise perinæorrhaphy, because they know that it is always possible that the patient may be in a worse condition after the operation than before." In reviewing Barnes's article, Carpenter says: "If his results were so unfavorable as one is led to infer from the foregoing quotation, it is not at all strange that he was inclined to abandon the 'paring' and adopt the flap-splitting method. The failure of the former plan in his hands, I will venture to suggest, may not have been so much in the plan as in the operator."

We have never had a failure in our own hands of the denuding operation, and can only conceive it possible where hasty or

careless work has been done. On the other hand, the flap-splitting operation has met with failure in such hands as those of Parvin and Mundé, two of its most devoted followers. Parvin, out of 22 cases, had one complete failure of union, with disappearance of the vaginal flap by sloughing, as well as a number of only partial successes. "In some instances, too, immediate union of the entire surfaces brought into apposition did not take place." Mundé, out of 17 operations, had one death from septicæmia. After having operated 71 times successfully, Säger is not sure that the operation is preferable to that of older methods.

The following description of the operation is given by Macphatter, and, as it was revised by Tait himself, may be considered authoritative: "The operation is begun by inserting the point of the scissors to the extent of $\frac{1}{4}$ to $\frac{1}{2}$ inch at the bottom of the old tear, which is usually represented by a white, hard, cicatricial, band. He then cuts outward and upward along the boundary-line between the vaginal mucous membrane and the skin of the labium of the left side, to the extent of $1\frac{1}{2}$ inches (0.038 metre) or 2 inches (0.051 metre), gently tapering in depth as he approaches the end of the incision. Beginning at the original starting-point at the bottom, the opposite side is split up exactly the same length and depth, so that the two surfaces, when brought into apposition, will exactly fit each other. The split surface of one side is brought against that of the other by sutures, and the operation is completed. Begin near the top of the split on the left side by passing the point of the needle into the raw surface as close to the skin margin as possible (the skin edge must not be included in the suture). It is passed under and comes out in the raw surface close to the vaginal mucous membrane. The point of the needle is then passed on over to the split on the right side to a corresponding point. It is then entered again into the raw surface close to the vaginal mucous membrane, passed under the split, and comes out again in the raw surface close to the skin. It is then threaded with silk-worm gut and the needle withdrawn, bringing back the suture. Three, four, or five similar sutures parallel with the first one, and about $\frac{1}{2}$ inch (0.013 metre) apart, will be all that is necessary. They are introduced exactly as the first. When the rupture is into the sphincter ani, an additional split down to each side of that muscle is made, beginning each one in the original incision about $\frac{1}{4}$ inch (0.006

metre) from the spot to where the point of the scissors was first inserted. These incisions are from $\frac{1}{4}$ to $\frac{1}{2}$ inch (0.006 to 0.013 metre) in length. This forms the rectal flap. One or two sutures are introduced as the others, which brings the raw surfaces into apposition and makes a complete union of the sphincter."

Alexander Duke⁸¹³ describes a new operation for restoration of lacerated perinæum. It involves in reality the same principle as the Tait operation, and is a flap-splitting procedure. The knife penetrates the recto-vaginal septum to the extent of $2\frac{1}{2}$ inches (0.064 metre), and the incision is enlarged laterally to 2 inches (0.051 metre), the whole incision being at right angles to the vulva. On the two points of incision being pressed together from side to side, a lozenge-shaped opening appears. The sutures are buried, and include the whole depth of the wound.

The advisability of an immediate repair of a lacerated perinæum has received the usual amount of consideration. Many are opposed to it, while others strongly urge it in all cases. Munn reports four failures, and thinks that the operative technique is of equal or greater importance than asepsis.

The different kinds of sutures recommended in perineal surgery are legion. The principal ones are silver wire, silk, catgut, and silk-worm gut. They all have their advocates and all have their advantages and disadvantages. Marcy again urges the use of the kangaroo-tendon. A good operator will obtain equally good results with any of the above-mentioned sutures.

The same difference of opinion prevails as to whether the trouble following a laceration of the perinæum be due to the torn muscles or fascia. Marcy and others stoutly contend that the muscles are principally at fault. It seems plain to us that both are equally at fault. One can hardly be torn sufficiently to do much damage without both being involved.

Cocaine is extolled by Smith and Carhartt⁷² in the performance of perineal operations. Their success has been uniform. There has been no pain and less hæmorrhage during the operation. Union has been just as prompt and complete as under general anæsthesia. The after-treatment of this class of cases is becoming more and more simple. This year the majority of writers withhold narcotics, open the bowels on the second or third day, and allow the woman to pass her own urine. The dressing consists in dusting the parts with

iodoform, smearing some unirritating grease over the wounds, or simply using hot-water injections without any dressing. The careful preparation of the patient for weeks before the operation by hot douches, rest in bed, etc., as recommended by Emmet, has not received as much consideration as formerly. One or two days have, in most instances, been deemed a sufficient length of time for preparation. In our own practice we have found this to be true.

Support of Perinæum.—Chassagny⁵⁰ describes an apparatus, devised by himself, for the support of the perinæum during labor. This consists essentially in a gutta-percha support, which is fastened to the thighs and applied so as to cover the perinæum and inferior half of the vulva. By means of elastic lacings, a distention of the perinæum in the transverse direction is permitted, but a downward stretching is impossible. The head is also thrown forward and made to glide under the pubis. It seems to us that meddlesome and complicated midwifery can hardly go further than this,—in this direction, at least.

Perineotomy.—Frommel¹¹¹² spoke of Zuckerkandl's method of extirpation of the uterus. This consists in making a curved incision between the tuberosities of the ischia, which passes midway between the anus and coccyx. The dissection is then continued until access is gained to the pelvic cavity. Sufficient space is obtained to manipulate any or all of the pelvic organs, and to ligate bleeding vessels. Sänger had removed a dermoid cyst by a somewhat similar incision, and advocated the operation in certain cases. Battlehner had also removed a neoplasm of the pelvis by this method. Hadra⁹⁶ has made a number of operations of this kind on animals, and thinks he has demonstrated the feasibility of the procedure for the living subject. According to Hadra, operations may be made in this manner on the rectum, prostate, bladder, ureters, seminal vesicles and cords; also for removing sub-peritoneal tumors, extirpation of the uterus, opening of sub- or intra- peritoneal abscesses, and for draining the peritoneal cavity. We believe that the application of this operation will be restricted to cancer of the rectum and a very few other troubles. It will never be able to compete with any of the operations at present made for gynecological and pelvic diseases. We have seen one such operation made, and are convinced that the procedure is too complicated and formidable for any other than a specialist to undertake.

URETHRA.

Vascular Polypoid Tumors.—According to Jondeau,⁴⁸³ one of the most frequent forms of urethral tumors in women is this polypus of the meatus. It is most frequently found at the period of greatest activity of the genital apparatus in women. Among the most common causes he mentions retention of urine, excessive coition, pregnancy, uterine and ovarian tumors. The situation of the tumor is usually at the orifice of the meatus. It is always on the inferior wall of the urethra. Sometimes it is sessile, at others pedunculated, and gives rise to pain, hæmorrhage, itching, and smarting. Medicinal agents can only produce palliative results. The best method of treatment is by excision with the knife, scissors, or curette. The tumors are liable to recur, and therefore the wound left after excision should be well cauterized. Dubar¹⁸¹ and Schwartz,¹⁵⁴ both contribute papers on the same subject and to practically the same effect.

Prolapse of the Mucous Membrane.—Herman,² reports a case of prolapse of the urethral mucous membrane in a child 9 years old. From early childhood the patient had had difficulty in retaining her urine. At the time of his seeing the child she was having a sanguineous vulvar discharge. An examination revealed a tumor, consisting of a sort of thick frill, deep-red in color, projecting for rather more than $\frac{1}{2}$ inch (0.013 metre) from the lower part and sides of the meatus. There was no complaint of pain or difficulty in micturition. A wooden staff was put in the urethra, and upon this the prolapsed mucous membrane was cut off all around with the platinum-knife of the Paquelin cautery. The morbid condition as shown in this case is a rare one. In reading many of the reported cases, Herman says one cannot help thinking, as to some, that they were cases of vesical tumors, projecting from the urethra; as to others, that they were simply urethral caruncles. The disease seems to occur chiefly in children and in the later years of childhood. The treatment advised by many is unnecessarily difficult and complicated. He pronounces Emmet's button-hole operation of the urethra as such, and thinks that it is not at all necessary to leave a catheter in the urethra for some days after the operation, as advised by Thomas and others. The pain and discomfort following such practice is considerable.

Moraud and Richard³¹⁷ report a like case. The girl was 10

years old. The tumor had been present as long as she could remember. The swelling was about $\frac{3}{4}$ inch (0.018 metre) in length, of a raspberry color, of soft consistence, and bleeding easily on being touched. At the point of swelling a small opening was seen, through which a sound passed easily and deeply into the urethral canal. Painful micturition, frequent shiverings, loss of blood, and leucorrhœal discharge were present. The treatment consisted in ligaturing the prolapse in two parts and allowing each part to separate of itself.

BLADDER.

Vesical Calculi.—Roberts²²⁴ reports the case of a woman, aged 54 years, who passed 180 calculi in two years. She had been confined to bed for six months. There was almost constant dribbling of urine. He put the patient under chloroform, dilated the urethra, and removed nine stones. The dilatation was accomplished in less than two minutes. In the discussion which followed, Yandell said he had dilated the urethra widely and without difficulty in a girl of 13 years, from whom he removed a large calculus. He considered the fear of incontinence something of a bugbear. He had removed stones in 5 cases, and in 1 had dilated sufficiently for both the stone and finger to pass together. Anderson thought that dilatation of the female urethra might be made to an almost unlimited extent. He had dilated the urethra and explored the bladder without anæsthesia. The operation is devoid of danger. J. N. Bloom thought there was danger of incontinence in dilatation. He favored making a vesico-vaginal fistula to remove the stone. Vance had seen a stone as large as a duck's egg removed *per urethram*. The procedure was not followed by incontinence of urine. Such an extensive dilatation of the urethra as some of the above is in no wise justifiable. Incontinence follows such procedure oftener than is told. Goodell, who practices this method much, says that the urethra should never be dilated more than an inch (0.025 metre), and even then it should be done very slowly, taking five to ten minutes to the operation. Even with this care he has met with some accidents.

Foreign Bodies.—Hicks²⁷ reports the case of a woman who, while masturbating with a hair-pin, lost it in the urethra. Ever after she had pain and incontinence, and was admitted to the hospital in a very debilitated condition and suffering excruciating

pain. Vaginal section was made and the pin, imbedded in a calculus, was removed. Dudley ²⁷₃₄ has met with 4 such cases. In 1 case the pin was only in the bladder for two days, but a calculus was already beginning to form. It was extracted by means of an ordinary long button-hook. J. W. Chambers ¹⁰⁴₁₀₄ removed from the bladder a stone weighing $1\frac{1}{2}$ drachms (5.83 grammes), whose nucleus was a match.

Cystitis.—More-Madden, ²₁₁, after dwelling on the great sufferings of patients afflicted with chronic cystitis, proceeds to give the causes of the disease. They are vulvitis, vaginitis, uterine flexions and displacements, uterine fibromata, extension of renal disease, calculi, cold, local injuries, reflex irritation, and long delay in micturition. General treatment, together with all forms of local injections and applications, are useless except as palliative measures. The choice in treatment lies between making a vesico-vaginal fistula (Emmet) or dilatation of the urethra. He says, speaking of Emmet's operation: "The objections to this plan of treatment are, however, so grave as to render any rational alternative that may be suggested for attaining the same object by less heroic means deserving of fair consideration and full trial. These objections are (1) the general difficulty of keeping the fistulous opening patulous for a sufficient time to allow the diseased bladder to regain its normal condition; (2) the irritation often occasioned by the button commonly employed for this purpose; and (3) the more serious trouble, which we meet with in some exceptional instances, of closing the fistulous opening when the desired object has been attained, and the consequent misery resulting from this mischance, by which the patient's last condition may thus possibly be rendered worse than her former state." He then describes a method which he believes to be new. He has cured 28 cases by this method. The plan of treatment he claims as his own is simply to so thoroughly dilate the urethral canal with an instrument as to be enabled to pass the index finger into the bladder and thereby paralyze the contractility of the sphincter for a time. This gives absolute physiological rest to the bladder mucous membrane. It may, however, be advisable in some instances to remove the proliferating vesical mucous membrane with the curette. In all cases an application of carbolic acid should be made to the bladder. The pain produced by this application may be controlled by cocaine. "I have only

to add that, according to my experience, the plan of treatment now recommended seldom requires to be repeated more than two or three times, at intervals of a week, to effect a cure of even the most aggravated cases of cystitis in women."

In the discussion Heywood Smith calls attention to the danger of producing permanent incontinence by the dilatation. Jessops introduces his finger into the bladder through the blades of the dilator without damage. Jessops calls attention to the fact that several years ago Teale advocated dilatation as a method of treatment in these troubles.

Strange to say, all the other gentlemen seem to accept More-Madden's treatment as something entirely new. The method is an old one with Americans, and is well known, on this side of the water, at least. As far back as 1880, Goodell¹¹¹⁰ says: "The treatment of cystitis by rapid dilatation of the urethra is somewhat empirical. . . . In the majority of cases the dilatation is followed by great relief—often a lasting cure. . . . Candor compels me to mention one objection to this operation, and that is the possibility of permanent incontinence following it." The treatment is mentioned in almost every American work on diseases of women, and most all call attention to the great dangers of incontinence following. The last work on the subject is by Skene, who says: "Forcible dilatation of the urethra has been advocated in the treatment of cystitis by many surgeons otherwise well informed." It would seem, then, that the operation is neither new nor particularly safe. On the other hand, Emmet's button-hole operation is both safe and of easy performance. The three objections made by More-Madden, and acquiesced in by his colleagues, have long since been overcome. The button spoken of was discarded by Emmet himself years ago, and we know of no one who uses it to-day. The fistula is kept open easily and permanently by the simple device of stitching the bladder and vaginal mucous membrane together, and thus covering all raw surface. Subsequently the fistula is easy to close, it having been made at a point of election. The after-troubles feared are merely mythical. Emmet has had a number of his cases go away and refuse to come back for the purpose of having the fistula closed, so great has been the relief. Finally, we must doubt that an old, chronic thickening of the vesical mucous membrane of years' standing will be cured in two

or three weeks by any treatment whatever. It takes months and years for the disease to develop, and it must take months for the membrane to resume its original condition of health, even under the most favorable circumstances. The cases reported as cured in the paper could not have been very grave ones.

Reflex Troubles.—Hunter McGuire⁸¹ writes that the first thing he does when a woman comes to him with the history of a chronic bladder disorder is to have the urine examined. If this is normal, or nearly so, the chances are that the disorder is functional.

To locate the cause of the bladder trouble the rectum must be examined for piles, fissures, etc. He has seen malaria give rise to this condition. Again it may be a pure neurosis, fear or emotions of any kind, hysteria. Masturbation he had found to be a sure cause, as well as anteversion of the uterus, pelvic abscess, shortening of utero-sacral ligaments, and ovarian disease.

He has found, as a rule,—when a woman has difficulty in retaining the urine, being compelled to void it frequently, when micturition is painful, is relieved when the bladder is empty; when, if she holds it too long, spasm of the bladder comes on and the water is involuntarily ejected in spurts,—that the disease is functional; but when there is great vesical tenesmus, pain, and straining after the urine has all come away, there is some real disease of the bladder or urethra.

Non-retention of Urine.—Sims²⁷ proposes gradual dilatation of the bladder by injections of water in cases in which there has been a gradual contraction of the walls of the bladder, due to an hypertrophy of the muscular coat, and the consequent reduction of its holding capacity to little or nothing. He has seen quite a number of these cases, both in children and adults, and has cured all but two. The disease in women he thinks is probably due to cystitis; in young girls it is the result of a not overwatchful mother, in infancy, where force of habit becomes second nature, or follows a paralysis of the sphincter muscle. The instruments necessary for the treatment are a silver catheter, with a small rubber tube connected with it, and a Davidson syringe. The quantity injected is known by the fact that the rubber bulb of the syringe holds 1 ounce (31 grammes). The water is warm. In one case, at the first attempt, the bladder would hold only $1\frac{3}{4}$ ounces (55 grammes). The bladder is dilated every day, each day injecting a

little more than the former one. The pain is sometimes unbearable. At the end of two months' treatment this bladder held 12 ounces (373 grammes), and for the first time in her life she awoke in a dry bed in the morning. At first the treatment is daily; after marked improvement is obtained, every second day for a month; later on, twice a week, and finally once a week. The patient requires a good amount of courage to go through with the treatment.

Sims states that Braxton Hicks is the only one he knows who has used this method of treatment. Hicks²_{Nov. 16} claims that he used it as early as 1868. E. H. Fenwick²_{Nov. 16} also claims to have used it in times past with success. Boldt²⁷_{Nov.} declares that he learned this method from Nisser, of Christiania, who uses Küstner's bladder-dilator. This consists of a short, straight catheter, made of glass or hard rubber, the outer end expanding into a funnel, whereby the urethra is completely occluded and the escape of the forcibly-injected water prevented. Skene thinks the stem of this instrument so long that it would impinge on the bladder-wall. McLean is of the same opinion.

VAGINA.

Atresia.—Fuld⁹⁵_{Jan. 18, 1883} mentions the case of a girl, aged 15, with double genital canal, unilateral atresia vaginæ, hæmatocolpos, hæmatometra, and hæmatosalpinx. He evacuated the blood from the vagina and then removed the Fallopian tubes by abdominal section. He has collected 65 cases of atresia with hæmatosalpinx. In 48 death occurred from the malformation, including 39 cases where the patients underwent operation. In cases not subjected to operation death is usually caused by bursting or suppuration of the tube. He recommends the double operation, which he performed, and considers that this proceeding is especially necessary when the tube has burst. Spaeth³⁴_{Oct. 29} describes a case of atresia vaginæ which caused him to perform a Porro-Cæsarian section. Picqué¹⁴_{Oct. 11} reports a case of a young girl who showed an entire absence of vagina and an infantile uterus. This was congenital. He made a vagina by a plastic operation.

Prolapse.—Smyly¹⁶_{June} recommends the use of Thure-Brandt's method of massage for this condition, but fails to state what results he has had with it; not much, we imagine. He says if pessaries can be used, the Hodge, or some modification of it, is

the best. However, plastic operations must be employed when the pelvic floor is destroyed, as pessaries will not remain in place. Asch⁹⁵_{R.S.H.S} recommends the extirpation of the uterus and resection of the vagina for persistent prolapse, especially in working-women. In the Breslau clinic it has been shown that in only 59 per cent. of the successful cases was the result permanent. A patient cannot be called cured who is obliged to wear a pessary or to have a subsequent operation. Alexander's operation and ventro-fixation are open to the same objection as plastic operations—the liability to recurrence of the prolapse. Vaginal hysterectomy is a safe operation, and a permanent cure is obtained by its means. Gebhardt, fifty years ago, first performed the operation, and since then it has been reported seventeen times for complete procidentia. The cases suitable for the radical operation are those of long standing, in which the vagina has become so thickened that primary union cannot be expected in a plastic operation, and those in which the uterus prolapses as soon as it is replaced and no pessary can be retained. The patient should have reached the menopause. The appendages should be removed if possible.

Vaginitis.—Currier⁹⁶_{jun.} classifies vulvo-vaginitis in children as follows: (1) the simple catarrhal; (2) the gonorrhœal; (3) the phlegmonous; (4) the diphtheritic. Phlegmonous vulvo-vaginitis, as it is usually seen, is due to traumatism. According to Vogel, the gangrenous condition may accompany or follow any of the exanthematous fevers. It is not always easy to differentiate the phlegmonous from the gonorrhœal variety. The course and treatment of the disease is the same as that in phlegmonous inflammations in any other part of the body.

Diphtheritic vulvo-vaginitis is by no means limited to diphtheria. Any morbid condition in which the blood contains an excess of fibrin or fibrinogenous material may develop the diphtheritic variety, especially if an abrasion of the skin or mucous membrane exists.

Simple catarrhal vulvo-vaginitis is the most common variety of the disease. It is most common among the poor and tenement-house population and in hospitals. The symptoms are a white or colorless discharge, which is secreted in part by the muciparous glands of the vulva and vagina, and is in part a transudation from the blood-vessels. Intense irritation follows the drying of this

discharge upon the skin. The scratching and rubbing of these parts by dirty and germ-laden fingers may cause the development of the phlegmonous variety. The cause may be an irritant injury, a constitutional disease, as syphilis, scrofula, rachitis, want of cleanliness. It may accompany the exanthematous fevers. The treatment of the disease consists in removing any co-existing constitutional trouble. Locally, cleanliness is absolutely necessary. After the acute stage is past vaginal injections of cleansing lotions should be used. Two drachms (7.77 grammes) of a 2-per-cent. solution of nitrate of silver should be injected gently every second day. In the interim a piece of absorbent cotton, anointed with a mixture of bismuth and glycerin, should be kept against the parts. If the urethra and bladder become involved, mild alkaline or simple emollient diuretics should be given. Currier does not believe that vulvo-vaginitis is caused by the migration of parasites from the rectum, and in this he is supported by many eminent authorities.

Gonorrhœal vulvo-vaginitis is pre-eminently an infectious disease, and Currier thinks it safe to say that it is always caused by the gonococcus of Neisser. He thinks the diagnosis can be sufficiently well made even if the gonococcus is not found. This is an important point from a medico-legal stand-point. Physicians are constantly called upon to decide whether or not a child has gonorrhœa, the whole question of conviction at times resting on their examination. We submit that from a mere examination of the discharge from a given case of vulvo-vaginitis it cannot be told, with any degree of certainty whatever, whether it is of a gonorrhœal character or not. We consider it little less than criminal for a physician to dogmatically state that a given case is such from the examination of the pus. As is admitted by Currier, it is difficult to distinguish between the phlegmonous and gonorrhœal varieties. Again, he admits that the gonococcus is not always present. At other times other micro-organisms, morphologically identical with gonococci, are found, and it takes an expert to tell which is which. And, lastly, the disciples of Neisser have by no means satisfactorily proven that the gonococcus is the cause of gonorrhœa.

This variety of the disease is very infectious, as is proven by hospital reports. In this variety the urethra is always involved

(Spaeth⁸⁴_{May 22}), and thus becomes an important diagnostic point. The disease may be contracted by actual contact with other infected persons; it may be carried on bed-linen, towels, etc., and may be acquired in breech presentations, just as the conjunctiva becomes infected in vertex presentations. The external genitals become swollen; the mucous membrane has an appearance resembling wet sole-leather; there is exquisite sensitiveness and at times severe pain on micturition. Suchard reports cases in which the inguinal glands were enlarged and painful. Halfield has seen similar cases, and reports one in which peritonitis resulted. Spaeth speaks of a few cases of pyosalpinx resulting. So it is seen that it may run much the same course as in the adult. The treatment is much the same as in the simple catarrhal variety, but the disease is much more intractable and often remains uncured. Von Dusch only cured 9 cases out of 19.

Horand,¹⁷_{Aug. 11} after an examination of 5090 women and 764 girls, came to the following conclusions in regard to leucorrhœa of females: Any urethral discharge in girls is pathological. Occasionally one can obtain, by pressing the meatus of virgins, a milky or caseous drop, the product of a folliculitis. Among women who have sexual intercourse there is often a urethral discharge, which may be from a folliculitis, but is often from gonorrhœal infection. From the examination of 483 women it transpires that the urethra was involved 143 times. Di Bella and Ingria⁵⁰⁵_{Nov. 29 to Dec. 28} come to the conclusion, after the examination of 276 cases, that the urethra is the most frequent part of the vulvo-vaginal tract involved. Horand considers uterine gonorrhœa rare. On the other hand, Eraud²⁴⁵_{Nov.} and Di Bella and Ingria pronounce it the second most frequent locality involved. Horand states that the vaginitis is much more common than the vulvitis. Discharges of a non-contagious nature appear after venereal excesses, drinking, irritation of the urethral mucous membrane, and under the influence of constitutional affections. Among non-gonorrhœal women, according to Horand, the menstrual blood, leucorrhœal discharge, and lochial discharge are not contagious. In this, however, he differs from most genito-urinary specialists. He treats urethral gonorrhœa by injections of nitrate of silver. The vagina and uterus should be penciled every four or five days with a crayon of nitrate of silver. Eraud,²⁴⁵_{Nov.} because of the almost exclusive intra-epithelia

situation of the gonococcus, curettes the urethra and uterus, after which he applies nitrate of silver with good results as far as the uterus is concerned, but with less marked benefit in the urethra.

Chancroids.—A. W. Stein²⁴⁵ relates the following unique case of serpiginous chancroid. Before entering the hospital the woman contracted a sore in her genitals. She had pain on micturition and acute pain in the left hip and thigh. Examination showed the presence of a phagedenic ulcer on the left wall of the vagina. The left inguinal glands were involved. There was an abundant purulent discharge. She was emaciated and weak. Some days later a profuse hæmorrhage from the vagina occurred and was treated with morphia and whisky. Other hæmorrhages occurred at different times. Subsequently, a gush of blood occurred which could not be controlled even by tampons of subsulphate of iron, and the woman died. An autopsy showed the cause of the hæmorrhage to be from an erosion of one of the anterior branches of the internal iliac artery. In the discussion, Taylor said he had seen a case of serpiginous chancroid eat the perinæum away and burrow up around the rectum, leaving a great hole, so that the rectum hung in the pelvic cavity about as one's hand hangs in the sleeve.

Hot-Water Douches—Tampons—Glycerin.—Crowell¹⁰² enters a protest against the indiscriminate use of hot-water vaginal douches. He objects to the length of time they are used, and thinks that a time comes in the course of pelvic inflammation when cold water acts to better purpose. He cites the case of a patient who had used hot injections for over a year without any benefit, but after the use of a cold injection for six weeks she was well. He also objects to the promiscuous and indiscriminate use of the tampon. He thinks many cases do badly simply from this treatment.

Hermann,⁵ reports the results of a series of experiments conducted with the view of determining if the local application of glycerin to the vaginal mucous membrane caused an increased flow of mucus. The glycerin was introduced on pledgets of cotton-wool and in suppositories, the weight of the drug being carefully noted, as well as the weight of the subsequent vaginal discharge. The observer came to the conclusion that when the vaginal secretions were scanty glycerin tended to increase them, but if they were copious it caused no perceptible increase in the amount.

This is contrary to our own personal experience and to the generally-accepted belief. Glycerin has a great affinity for water, and will certainly deplete the blood-vessels near which it is placed. This can be proved by injecting a little into the rectum or nose, and noting the free secretion of serum which follows.

Malignant Diseases.—Arnold ⁶ says the variety of carcinoma met with in the vagina is usually the squamous-celled, and is found occurring in one of two forms,—as a localized papillomatous growth or a flat, infiltrated deposit, which rapidly ulcerates and invades the surrounding parts. Although it is essentially a disease of advanced life, many cases are on record of its occurrence at an earlier date than is usual with the carcinomata, and it appears to prove fatal at a comparatively early period. Küstner reports 22 cases. Of these 2 were under the age of 20. The patient reported by Arnold was only 22 years old.

Hawley ¹ Oct. 10 reports a case of carcinoma of the vagina which had progressed so far as to render any relief to the woman impossible. From the day she entered the hospital it was necessary to give her large doses of morphia to control the intense pain from which she suffered. The patient being pregnant and her condition so hopeless, the treatment was conducted in the interest of the child. Cæsarian section was done at seven and a half months, and a living child delivered. It, however, died four hours after birth. A hard lump was noticed in its axilla, but no microscopical examination of it could be obtained on account of the watchfulness and objection of the father.

Rosthorn ⁸ Sept. 10 describes a case of primary sarcoma of the vagina in a woman 43 years old. The growth was removed and the diagnosis verified by the microscope. Kolisko ⁸ Nov. 9 to 11 cites 3 similar cases, which were seen in the clinics of Billroth and Weinlechner.

Cysts.—W. Thorn ³¹⁷ Sept. 21 says the origin of vaginal cysts is differently interpreted. They may arise from the vaginal glands (von Preuschen), from the remnants of Gärtner's canal and Müller's ducts (Veit); they may be true new growths in the connective tissue (Kaltenbach); they may be derived from the lymph-follicles and dilated lymph-glands (Klebs); others think they are mere mucous-membrane crypts closed by adhesion, or that they may be traumatic hæmatoma in the perivaginal connective tissue (Morel-Lavallée). Thorn thinks that they only occasionally arise from

traumatic hæmatoma, and are then deeply situated. Nothing is known concerning the ratio of these etiological factors. The cyst-wall differs in construction: at times it consists of a thin layer of fine connective tissue; at other times it shows an analogous construction to the mucous membrane of the vagina. It is lined with cylindrical and squamous epithelium. Very frequently it occupies a submucous situation, but more frequently, however, arises from the perivaginal connective tissue, and has nothing to do originally with the vagina.

Poupinel,⁹¹ states that cysts of the vagina are rare, and he believes that most of them arise from the vaginal glands, which are as rare as the cysts themselves. He divides the treatment into (1) puncturing, with or without injection of iodine; (2) incision, simple or combined with cauterization of the cyst; (3) partial excision, with application of caustic to the interior of the cyst; (4) total extirpation or enucleation.

FISTULÆ.

Vesico-Vaginal.—Boldt,²⁷ reports a case of this variety of urinary fistula, which was caused in an unique manner. The nurse had been instructed to wash out the bladder every few hours on account of an attack of cystitis. Unknown to the attendant, she used a male silver catheter, and, after having introduced it, was in the habit of forcibly turning the point downward. The result, after some days' treatment, was the development of a vesico-vaginal fistula. A. P. Dudley,²⁷ observed a case of vesico-vaginal fistula caused by a watch-spring pessary covered with rubber. The steel spring had broken and protruded through the vesico-vaginal septum into the bladder. K. Israel,⁹⁶ after closing a vesico-vaginal fistula, found that the sphincter vesicæ had been so much involved in the original injury that the patient had incontinence. Not being able to control this in any other manner, he made a supra-pubic opening into the bladder, and then, after two attempts, succeeded in permanently closing the urethra. The patient drew her urine with a catheter every six hours through the supra-pubic opening, and lived a perfectly comfortable life.

Heustis,⁹ found it difficult to manipulate the parts in closing a vesico-vaginal fistula with the patient in a Sims's position, and, finding the knee-chest position a hard one in which to maintain

the patient, devised the following plan: He had a thick, hard pillow shoved under the upper part of the patient's thighs, reaching to the pubis, but not to the pendulous part of the belly, the woman being prone, with the legs stretched out straight. The vagina was so widely open and expanded that the operation was done with the greatest ease.

Chacon ⁶⁷³_{on} describes a "vesical elevator." It consists of a handle with a metal rod like a probe, to be introduced into the female bladder or urethra, then through the fistula, and pieces of gutta-percha of various shapes and sizes which are secured to it, giving the whole, more or less, the aspect of a crutch. The instrument is intended to lift the protruding parts of the bladder in large fistulas, to prevent the vesical mucosa from being hurt during the operation. It is removed before the sutures are tied.

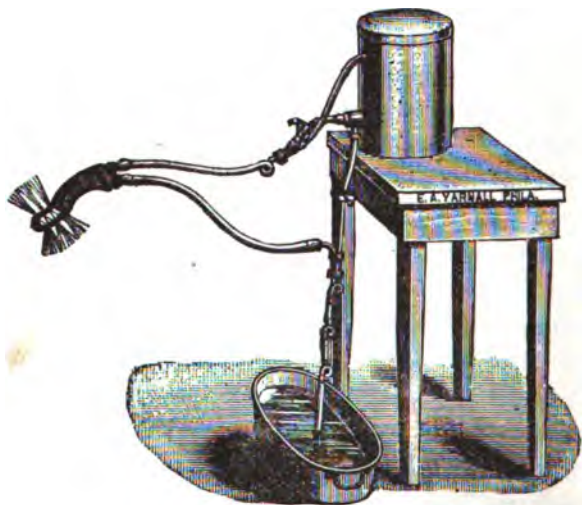
Ernest Hart, ²_{Mar.}, says that Verneuil, in operating on vesico-vaginal fistulas, substitutes cauterization of the fistula, followed by scraping the granulations, following as a result of the cauterization, for paring with the bistoury. This method of secondary reunion is capable, he considers, of rendering good service, especially when previous paring and suture have partially failed.

Urethro-Vaginal.—Polaillon, ²⁴_{Mar.}, reports a case of fistula of this variety situated on the posterior wall of the urethra. He attempted to close it by the following method: He dissected across the orifice of the fistula a fold of mucous membrane from the internal portion of the anterior wall of the urethra and the neck of the bladder, and sutured it to the posterior wall of the urethra. The patient was discharged cured. Later, urine began to trickle from an opening left by a suture which had accidentally cut through the tissues. The urine did not, however, irritate the denuded surface.

Intestino-Vaginal.—R. A. Vance ²²²_{Mar.} reports the case of a woman, who, with the aid of manual interference, gave birth to a dead foetus. After an illness of five days there was a gush of offensive material from the vagina, followed, a few days later, by a large slough, together with feculent material and intestinal gases. Later still, an examination revealed two openings in the upper part of the vagina, behind the uterus,—one large, with bowel mucous membrane thick and protruding; the other small and contracted,—with a sharp semi-lunar fold between the two, projecting to a level with the vaginal orifice. Fæces flowed from the larger

opening, but no material could be obtained from the other. There had evidently been a laceration of the vaginal dome, with protrusion and sloughing of a fold of intestine. A Dupuytren enterotome was placed on the spur and removed on the sixth day, a small amount of slough coming with it. Within a few hours of its removal the patient had a small natural passage. The passages gradually became larger, and finally the edges of the vaginal fistula were denuded and brought together by sutures. The result was a perfect cure.

Intestino-Vesical.—C. P. Noble,⁹ had a patient who passed



BOZEMAN'S IRRIGATOR AND SELF-EXHAUSTING DRAIN FOR CONTINUOUS VAGINAL DOUCHE.
(*New York Medical Journal.*)

fæcal matter *per urethram*. There was no bladder symptoms, and it was thought the material might come through the vagina. No vaginal fistula being found, he used the hydrogen-gas test to the intestines. The gas was forced into the rectum, and, escaping through a silver catheter introduced into the bladder, was ignited and burned freely. No gas was heard to pass the ileo-cæcal valve, thus demonstrating that the opening was into the large intestine.

Irrigation.—N. G. Bozeman,¹⁵ has devised an apparatus by which continuous vaginal irrigation and drainage can be applied, and at the same time the patient kept clean and dry. A glance at the accompanying cut will give a clear idea of the whole apparatus ready for application.

DISEASES OF PREGNANCY.

By THEOPHILUS PARVIN, M.D., LL.D.

PHILADELPHIA.

STERILITY.

TREUB, of Leyden,³ believes, from his own statistics, that in 36 per cent. of unproductive marriages the husbands are at fault; de Sinety's estimate is 50 per cent. Treub, after reviewing the common causes of sterility in the female, such as impotence, vaginismus, uterine deviations, perimetritis, chronic endometritis, and general diseases, added that, in many cases of married people apparently quite able to procreate, the union remained sterile from causes which escape the appreciation of medicine. Fürbringer⁶⁰ believes that sterility in the male is far more frequently the cause of barren marriage than is generally thought to be the case.

Philbert⁸⁵ narrates 5 instances of sterility due to obesity, the women having been married several years without bearing children, and they all became mothers after the removal of the excess of flesh.

Fournel,¹⁰⁰ discussing the effects of obesity on the menstrual functions and on parturition, believes that the same disease of the blood-corpuscles which is supposed to produce obesity and relaxation of muscular force acts also on the muscular fibres of the uterus and ovaries, thus inducing menstrual disorders, sterility, etc. An obese female is never sure of carrying her child to term. The muscular tissues of the uterus are imperfectly nourished, and show various lesions and atrophy. The respiration is also impaired by deposits of fat in the heart, respiratory muscles, and other tissues affecting respiration directly or indirectly. Even when the child is carried to term the delivery is generally tedious and irregular. He states that obesity causes languid functions of the ovaries, hence sterility; hæmorrhages and abortion through want of oxidation of the blood-corpuscles; asphyxia of the fœtus, which, by the accumulation of carbonic acid, stimulates contraction, thereby resisting natural labor.

Treatment.—McKee²⁷ advises, in the treatment of sterility,
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cure of vaginismus; restraint in the use of alcoholic stimulants; treatment of obesity, of endometritis (commending especially as a local application in the latter a mixture of chloride of iron and glycerin, 1 part of the former, 3 of the latter); dilatation of the cervix, and correction of flexions of the uterus. He states that "catheterization of the Fallopian tubes, in the hands of an experienced operator, is a feasible and, in some instances, an effectual method of treating certain cases of dysmenorrhœa and sterility otherwise incurable." It certainly would be interesting and valuable to have the cases in which such treatment cured either sterility or dysmenorrhœa collected. I do not believe the treatment would be sustained by any such collection. McKee mentions that phosphide of zinc and also belladonna have been recommended, but adds that the latter remedy has not been very successful in his hands. He regards artificial impregnation "as a last resort in otherwise hopeless cases," and gives directions for its employment.

Ashby¹⁰⁴ commends the continuous electric current, the greatest strength used being 25 milliampères, for the relief of cervical stenosis; he regards this method of dilatation as valuable in sterility in order to treat the disease of the endometrium accompanying the stenosis.

P. E. Outerbridge⁵⁹ has introduced an instrument for the cure of sterility depending on dysmenorrhœa, flexions, etc. It consists of a continuous steel wire, made so as to form an anterior and posterior blade, with a slight eversion at one end, and the other end bent at right angles. The instrument is introduced five or six days in advance of the date of the appearance of the menstrual flow, and allowed to remain in position until from five to eight days following the period, when it is removed. He has used the instrument in a number of cases of sterility with successful results, and states that in no instance was there any irritation following its use. It is a question, however, whether the instrument in the hands of the practitioner not dexterous in the use of uterine instruments might not lead to sloughing and inflammatory troubles of the cervix by remaining in the canal for so long a time.

FERTILITY.

Bland⁵ narrates the case of a woman dying when more than 60 years old who had given birth to 28 children. She had single

pregnancies only twice, the others ending in the birth of twins, triplets (three times), and quadruplets (once); all the children born in the last pregnancy referred to lived to adult years.

Chaleix¹⁸⁶_{Oct. 1} narrates a case of pluriparous pregnancy ending in miscarriage at five months; three foetuses were expelled, and, being put in a warm bath, they lived for fifteen minutes; they were all males. The first foetus had a single placenta, but the other two had a common placenta, the insertion of the cords being, as is not infrequent in such conditions, velamentous.

Westervelt²⁰⁷_{Aug.} reports the case of a woman delivered of triplets at the seventh month of pregnancy. All the triplets in this case were of the female sex. These cases seem to indicate that triplets of the same sex were derived from a common yolk. If twins are derived from one yolk they are of the same sex; so, too, double monsters are always of the same sex.

Buchanan²⁰²_{Mar. 25} reports delivering a woman in her seventh confinement of triplets (2 females and 1 male), all 3 of which lived. The patient at her third and fourth confinements had twins.

Pereira da Cruz⁶_{Jan. 22} reported to the Lisbon Medical Society the case of a woman who in seven years had four confinements, at the first of which she gave birth to twins, which were either still-born or died soon after birth; at the second, one year later, triplets; at the third, five years later, quintuplets, the first living fifty days, the second twenty-eight hours, and the others still-born; while the last confinement was single, the child being still-born.

Somerville²_{Dec. 22, '90} attended a woman who gave birth at eight months to quadruplets, all of which died within forty-eight hours of birth.

E. C. Anderson⁶⁴⁷_{Oct.} reports a case of superfecundation in a colored woman, mother of 8 children, all black, who at her last confinement gave birth to twins, 1 black and the other white.

Steffeck⁸¹⁷_{Nov. 21, '90} narrates a case of quadruple pregnancy, labor occurring spontaneously at term, none of the children surviving.

Pinard⁴⁸_{Jan.} reports a case of triple pregnancy, diagnosed by palpation, in which the mother suddenly died from dyspnoea during the first stage of labor, and the children were all delivered through the vagina and lived. Post-mortem examination showed an enlarged and intensely-congested liver and fatty heart, death being caused by sudden dilation of the ventricles and heart failure.

Berlin,¹⁷⁵_{Dec., '90} in a study of twin pregnancies, found the average of Europe to be 1 to 89 pregnancies. The highest ratio of twin pregnancies was in Great Britain, 1 in every 63 pregnancies, and the lowest in Belgium, 1 in every 103 pregnancies.

E. W. Mulligan¹⁷⁰_{Aug.} attended a woman in labor, who, when pregnant six months, had intermittent labor pains and rupture of the bag of waters, but nothing further. At term she gave birth to a fully-developed child and a dead 6 months' foetus, flattened out. This was clearly a case of twin pregnancy, with "survival of the fittest." The dead foetus remained in the uterus without giving any bad symptoms for three months. W. B. Cauble¹⁶⁹_{July} reports a somewhat analogous case, in which a woman, pregnant about four and a half months, had vomiting and slight uterine hæmorrhage. Seven months after this date labor began, and she was delivered of a living 7 months' child and a dead 4½ months' foetus. The history of the case shows that the second conception must have occurred shortly after the date of the hæmorrhage, and while the 4½ months' foetus was still in the uterus.

Porak¹²⁶_{Jan.} says that the weight of twins is rarely alike, and in many cases varies considerably. He thinks that the point of attachment of the placenta has much to do with the weight of the child.

SIGNS OF PREGNANCY.

Nottage²⁸_{Apr.} describes Hegar's sign as a marked thinning and softening of that portion of the body of the uterus that is immediately above the cervix. To determine this and to facilitate the examination, the rectum is distended with water. Depress the uterus with one hand over the abdomen and pass the index finger of the other hand into the rectum, up through the third sphincter, and press the finger-tip against the posterior wall of the uterus immediately above the utero-sacral ligaments. Pass the thumb of the same hand into the vagina and bring it in contact with the anterior wall of the uterus just above the cervix. The intervening tissues may, in most cases, during the last half of the second month, be compressed by the thumb and finger almost to the thinness of a visiting card. This compressibility of the lower uterine segment is Hegar's sign.

Llewelyn Elliott,⁶¹_{June '22} places great reliance on the pulse-test (Jorissenne's sign), and cites 18 cases of success in diagnosing preg-

nancy early. The value of this test consists in the slight variation shown in the number of radial pulsations when pregnancy exists, whether the patient is standing, sitting, or lying down.

Vander Veer,²⁷_{Nov.} in an exhaustive paper on concealed pregnancy, gives the results of a study of 68 cases of abdominal disease in which during laparotomy pregnancy was found to exist. He calls especial attention to the necessity of obtaining a full history of each case before operation, so that, as far as possible, error of diagnosis may be avoided, and he considers that it is the duty of the profession to maintain that pregnancy may be absolutely concealed, especially prior to the fourth or fifth month, by other intra-abdominal conditions.

Phantom Pregnancy.—Nicoll²⁷_{Feb.} brought to the attention of the New York Obstetrical Society a case of phantom pregnancy in an intelligent woman who had previously given birth to a still-born child at full term. There was cessation of the menses, enlargement of abdomen and breasts, a milk-like secretion being noticed, and the patient stated that she felt the foetal movements. A month before labor was apparently due a vaginal examination showed that no pregnancy existed. Nicoll calls particular attention to this case as emphasizing the importance of making a thorough examination in all cases where positive information is desired of the existence or non-existence of pregnancy.

Most Probable Time of Conception.—Schneider³⁸³_{Aug.} regards the four days preceding and the eight following the menstrual flow as most favorable for impregnation; decided preference is given to the first period.

ABORTION.

Etiology.—Graily Hewitt,⁶_{Jan.} reports a case in which repeated abortions were due to an acute flexion of the uterus. Before the patient's last pregnancy a pessary was inserted and the cervical canal frequently dilated, and, after pregnancy had occurred, the elevation of the fundus was favored by the dorsal position, by the use of a pessary, and by occasionally pushing it up with the hand. The woman went to full term, and gave birth to a healthy male child.

Swan,²_{Feb. 16} reports 3 cases of frequent abortions, due to lead poisoning from service-pipes, which ceased when the cause was removed.

Robert Park²¹⁸ cites a case of hæmorrhage and threatened miscarriage, in a woman five and a half months pregnant, from taking 10 to 15 grains (0.65 to 0.97 gramme) of quinine. L. Atthill,² in threatened miscarriage with hæmorrhage, where uterine contractions have not been excited, gives ergot. He considers that ergot, quinine, or strychnia in ordinary medical doses have no ill effect on pregnancy. Doyle² reports cases in which the administration of quinine for intermittent fever has brought on abortion.

Treatment.—The management of the secundines in abortion has received considerable attention during the past year, and, while a large number of the profession favors the expectant plan of treatment, there are many who continue to advise active interference. J. G. Cecil²²⁴ considers that to the end of the second month very little trouble is generally encountered, as the products of conception are cast off together, making the abortion complete; but it is during the third, fourth, and fifth months that the judgment of the physician will be more often taxed, as after the latter month miscarriage partakes more of the character of labor at full term. He advises against force being used to tear away from the uterine wall a closely-adherent placenta, which the chances are that judicious delay will see separated and expelled without the risks incurred by the use of forcible means. When, however, a fetid discharge appears, the proper treatment is to immediately dilate the cervix and remove the mass with the finger or a dull curette, followed by antiseptic uterine injections or the insertion of a pencil of iodoform.

Demelin,⁸⁵ believes that septicæmia is much more liable to follow the retention of the placenta of a 3 months' fœtus than one of 4 months, and therefore advises the removal and detachment of the placenta with two fingers when the fœtus is but 3 months old, while the delivery of the after-birth of a 4 months' fœtus he considers can be left to nature.

W. D. Holmes⁹⁹ calls special attention to the value of the method employed abroad in the treatment of unavoidable abortion, which consists in the injection into the uterus, every three or four hours, between the walls of the organ and the ovum, of carbolyzed water as hot as can be borne, using a Bozeman catheter. By this treatment the risk of hæmorrhage is lessened, and it is said to be invariably effective.

Noble²⁰⁷ used glycerin tampons to the cervix in a case four and a half months pregnant, presenting a history of repeated abortions, where there was engorgement of the uterus and a bad ante-flexion. The glycerin applications and rest in bed reduced the congestion, and the uterus was then readily lifted up and held in position.

Cornil⁷ relates a case of abortion of a foetus 6 inches (0.152 metre) long and weighing over 2 ounces (62 grammes), followed the next day by another abortion of a foetus similar in size. The woman died from the absorption of the solution of corrosive sublimate, 1 to 2000, which was frequently injected into the uterus after each abortion, evidences of poisoning being found in the large intestine, liver, and kidneys.

Von der Goltz,¹⁵⁰ in cases where artificial abortion is indicated on account of a constant hæmorrhage of a small quantity of blood from the pregnant uterus, discards the usual forcible distention of the cervix, and recommends the introduction of Hegar's dilator, followed by a tampon saturated with a 4-per-cent. solution of salicylic acid.

Murray,¹ in a paper read before the Obstetrical Section of the New York Academy of Medicine on the management of abortion, advocated tamponing until the uterus was sufficiently dilated, emptying the uterus, removing any adhering placenta with the blunt curette, and then washing out the cavity with an antiseptic solution. In the discussion of the paper Mundé deprecated the expectant treatment as exposing the patient to the danger of hæmorrhage and septicæmia, and always preferred emptying the uterus at one sitting.

Statistics of Abortion.—Leith Napier⁹⁷⁸ has analyzed a large number of cases of abortion occurring in his practice, and finds that habitual abortion forms 18.6 per cent. of the total number of abortions. Uterine diseases account for at least 50 per cent. of the cases analyzed; reflex causes, either simple or complicated, 21.528 per cent.; syphilis affecting the foetus, retroflexion, salpingitis, and rheumatism, each 7.143 per cent. The results of treatment showed 78.477 per cent. cured and subsequently bearing healthy living children, while sterility resulted in 21.528 per cent., of which 14.286 per cent. have incurable uterine affections or are past child-bearing, and 7.242 per cent. are healthy but sterile.

Langry²²⁰_{Mar. 3} reports the premature birth of an ovum of 3 months, with regular placenta somewhat atrophied, but upon opening the amnion no foetus was found. He reports another case of four months' pregnancy, which also aborted an ovum containing no foetus, but a small mass the size of a pea.

Induction of Premature Labor.—Champetier de Ribes⁴⁸_{Dec. 78} describes an improvement on Tarnier's elastic balloon to induce premature labor. It consists of a pear-shaped rubber ball, which, when reduced to a small size, is inserted into the cavity of the uterus and inflated. When pains commence it is slowly expelled in its distended state, and the foetus soon follows. E. Chenevière,¹⁸⁷_{Dec. 78} instead of using the usual sponge-tent to induce labor, recommends iodoform tampons, and claims from them a quicker and safer delivery.

VOMITING OF PREGNANCY.

Guéniot,²⁸⁶_{Oct.} speaking of a rational treatment of vomiting during pregnancy, says that a morbid or abnormal state of the uterus, the nervous system as the carrier of reflex action, and the stomach are the three prime factors in this malady. He therefore urges that (1) any abnormal state of the uterus and appendages, whether they be ulcers, excoriations, flexions, or of a specific nature, should be corrected; (2) the nervous system, particularly the spinal nervous centres, should receive attention, for which he recommends topical applications to the spine and rectal injections of from 20 to 30 grains (1.30 to 1.95 grammes) each of bromide of soda and chloral hydrate in $\frac{1}{2}$ pint ($\frac{1}{2}$ litre) of water and milk; (3) only liquid food should be made use of. Iced coffee, Vichy and carbonated waters are recommended.

J. Wissel,¹¹⁸_{July 21} believes that the change which occurs in the organism of pregnant women, through the loss of red corpuscles and albumen, reacts upon their individual disposition and calls forth various ailments, among which is pernicious vomiting. He relates a grave case which was cured by injection per rectum of potassium bromide and chloral. He also states that relieving the intestines of accumulated fæces by injections often gives relief.

Quevedo,⁷⁸⁸_{Dec. 10, 78} reports 2 cases relieved by dilating the cervical canal. Kirkpatrick⁸⁶_{Apr.} suggests the use of glycerin tampons as a means of reducing the congestion of the cervix, citing a case benefited by this treatment.

Kingman⁹⁹_{Feb.} reports a fatal case of pernicious vomiting in a primipara of rheumatic diathesis,—poor digestion, compressed waist, uterus anteflexed and low down in the pelvis, with eroded cervix and roughened endocardium. Raising the uterus and local applications to the cervix gave temporary relief. Later, however, the cervix was dilated and a 4 months' macerated fœtus delivered. Death suddenly occurred the same day, apparently from pulmonary thrombosis.

R. B. McCall,⁹_{Nov.} has found salol in 2-grain (0.13 gramme) doses to relieve the vomiting of pregnancy complicated with acid dyspepsia.

Willoughby,⁶_{June.} reports success by the use of 1-grain (0.065 gramme) doses of phenol in an ounce of water every four hours.

In using cocaine for the vomiting of pregnancy, Fraipont Weiss prescribes it in $\frac{1}{2}$ -grain (0.032 gramme) doses in solution every half hour. Engelmann and Holtz use a solution of from 3 to 10 per cent., giving daily doses of from 10 to 30 drops. Bois has obtained good results from a combination of cocaine and vaseline applied to the cervix night and morning.

Stocker³¹⁷_{Apr. 20} mentions a woman who, whenever she became pregnant, suffered from vomiting to such a degree as to endanger her life, necessitating an artificial abortion in three consecutive years.

HÆMORRHAGES IN PREGNANCY.

M. Stumpf,⁹⁵_{V. 84. N. 1.} in a dissertation on hæmorrhagic diseases during confinement and during the menstrual period, argues that the cause is generally an hereditary diathesis, and that the above-mentioned periods favor manifestations of hæmorrhages, purpura hæmorrhagica, etc.

A case of pregnancy is reported³¹⁷_{Nov.} in which, at the fourth month, violent uterine pains and symptoms of internal hæmorrhage were manifested. Laparotomy was performed, and a large quantity of blood found in the peritoneal cavity. Pregnancy had taken place in the rudimentary uterine horn, which had a laceration on its posterior surface. The patient died from general peritonitis.

Batten,⁶¹_{Apr. 18} reports a case of uterine hæmorrhage in a woman two months pregnant, which continued more or less for five months, premature labor then occurring. The membranes contained no liquor amnii. The placenta showed evidence of having for some

time been separated for about one-third of its surface from the walls of the uterus.

DISEASES COMPLICATING PREGNANCY.

Albuminuria.—Numerous contributions upon this subject are found both in American and foreign medical journals during the past year. Tyson⁸¹_{Oct. 30} advocates the induction of premature labor in cases of Bright's disease complicating pregnancy, if there has been puerperal nephritis with grave complications in a previous pregnancy, and in all primigravidæ in whom there is Bright's disease previous to pregnancy. Whether this treatment must also be employed in acquired puerperal nephritis, Tyson believes should be determined by the symptoms presented in each case.

Partridge²⁷_{Apr.} takes the ground that in all cases in which there is a reasonable probability that chronic nephritis exists, no matter how slight the degree, pregnancy should be interrupted just as early as gestation is known to exist. The writer's words have been quoted. It is remarkable that in the discussion which followed the reading of this paper before the New York Obstetrical Society, while most of the speakers advised the induction of premature labor, not one considered the proposition which has been quoted—a thesis involving considerably more than the interruption of the pregnancy after the child is viable in case of chronic nephritis. There need only be a reasonable probability of such disease, and immediate arrest of the pregnancy as soon as its existence is known. However generally (by no means universal) the opinion of the profession may be favorable to the induction of premature labor in such cases, we greatly doubt whether any considerable number of reputable obstetricians will indorse Partridge's proposition.

Hundley¹⁰⁴_{July} advises diuretics, hydragogue cathartics, and muriated tincture of iron as a tonic and diuretic. If there be no improvement, the patient getting worse, labor should be induced.

Gustav Braun⁸⁴_{Apr.} induced labor in a primigravida because of severe dyspnœa and albuminuria; the woman was delivered of triplets.

Peter¹⁷⁷_{Apr. 22} regards the treatment of albuminuria in pregnancy as very important, for otherwise the fœtus is liable to perish, and the mother, though she survives the pregnancy, is doomed to perish with Bright's disease.

Hirst¹¹² reports a case of death from albuminuric apoplexy in the sixth month of pregnancy; also the death of a woman from eclamptic convulsions, occurring twenty-four hours after the birth of a full-term child, which were due to acute nephritis developed three weeks before labor.

Meyer⁵⁹⁸ found albumen in the urine in 5.4 per cent. of pregnant women; 19.7 per cent. of all women examined (1124) had premature labor, but this percentage rose to 27.7 per cent. of those who had albuminuria, and of those having albuminuria with casts to 41.2 per cent. Of 1138 women whose urine was examined during labor 25 per cent. had albuminuria, and in nearly one-half of these there were casts.

Eclampsia.—Pilliet,⁸ has observed certain hepatic lesions, both in cases of jaundice and in those in which it did not appear, in women dying from eclampsia, these lesions being similar to those described by Jurgens. The history of such lesions may be thus epitomized: A capillary in the vicinity of a given space is dilated and filled with red globules; its transverse anastomoses are also dilated; there is thus formed around this point a series of ampullar dilatations, including a centre with irregular contour. The globules contained in these dilatations are rapidly changed and discolored; at a more advanced stage the included centre undergoes a degeneration involving the hepatic cells, the globules, and the capillaries.

Page⁸¹ reports a case of eclampsia in the seventh month of pregnancy. Premature labor occurred and the woman recovered.

Nervous Disorders.—Chambrelent¹⁸⁸ contributes to the study of the relations between pregnancy and some affections of the nervous system. He reports first a paraplegia occurring in a woman when six months pregnant. Labor occurred at the normal time, but the patient was not conscious of suffering. Delivery was not followed by any amelioration of the paralysis, which, it was believed, was independent of the pregnant state.

He next gives a case of hysteria and epilepsy occurring in the same subject. The attacks of hysteria were lessened during the pregnancy, but those of epilepsy increased. The author quotes from a recent thesis by Brand, in which the relations of epilepsy to pregnancy have been studied in 30 cases, giving these conclusions: The influence of pregnancy upon pre-existing epilepsy is

favorable, unfavorable, or null. The cases in which the influence of pregnancy is favorable are the most numerous. The third case was one of pregnancy in a woman suffering with spasmodic tabes. The pregnancy, which continued to term and ended in the birth of a well-developed, living child, caused no modification of the disease. The fourth case was one of spasmodic contractions involving a large number of muscles, and was transitory in duration. The muscles especially subject to these spasms were those of the face, of the neck, of the left arm, and of the legs, as well as the diaphragm and the muscles of the abdominal wall. Delivery occurred at term, the child living, and a month after a notable amelioration of the movements was observed. Another case reported is one of tuberculous meningitis in a woman six months pregnant. The woman died ten days after her admission into the hospital. From a study of the clinical history and from the autopsy the author concludes that tuberculous meningitis, contrary to that which occurs in other grave acute diseases, does not appear to interrupt the course of pregnancy; that the foetus is living up to the final period of the disease, and does not participate in the tuberculous process; and that if labor be induced in a case of the disease after the child has become viable, there is the greatest probability that a living child will be born.

Chorea.—In the discussion of this subject in the London Obstetrical Society, Herman⁶ stated that he believed in the connection between chorea and pregnancy, and that the majority of such cases were benefited by the induction of abortion or of premature labor. Jones¹¹⁰⁸ reports a case of chorea complicating pregnancy at seven months, which ceased after the induction of premature labor, the foetus being decomposed; also a case of chorea, with delirium and paralysis of the left arm, with recovery after confinement.

Hysteria.—Ernest F. King⁶¹ reports the case of a woman who, in three successive pregnancies, had manifestations of severe hysteria, beginning at the fourth month. The fact is incidentally mentioned that when a school-girl there were hysterical manifestations at each monthly period, thus confirming the fact that hysteria, just as chorea, in pregnancy, is usually the recurrence of a disorder which previously appeared. Brunon,²⁰⁸ on the other hand, reports a case of hysteria in a married woman which disappeared upon the occurrence of pregnancy.

Meningitis.—Chambreleut,⁴⁸ advocates the induction of premature labor in all cases in which acute meningitis occurs, whether the latter be tuberculous or simply inflammatory. He bases his arguments on numerous observations where children of good health were born during the last stages of meningitis of the mother; one of these was a post-mortem delivery. Of 7 cases in which acute and tuberculous meningitis was the cause of the death of the mother, only one had a spontaneous delivery, labor in the others being terminated artificially with saving of life of the children. In all cases of post-mortem examinations of pregnant women dying from acute meningitis, the dead foetus and all the membranes have been found to be normal, and Chambreleut contends that the children would have lived had a premature delivery been induced. This he advocates strongly after the seventh month when acute meningitis complicates pregnancy.

Diabetes Mellitus.—F. A. Packard¹¹² reports a case of diabetes mellitus dependent, it was believed, upon pregnancy.

High Temperature.—Liebmann³¹⁷ cites a case of a primipara who, beginning with the fifth month of pregnancy, was affected every evening with a temperature of 104° F. (40° C.). Artificial labor was induced in the seventh month, and immediately after the delivery of a living child the fever ceased and the mother recovered rapidly. No organic changes having been found, Liebmann thinks the cause of the fever to be an abnormal change in the heat-regulating centres during pregnancy.

Measles.—Collins¹⁸⁶ reports the case of a woman who, when four months advanced in pregnancy, was attacked with measles, death resulting nine days afterward.

Icterus.—Illoway²⁷ had a patient who suffered with icterus from the beginning of her pregnancy. He terms the case icterus gravidarum, but in the course of the paper states that the disease “set in at so early a date that it is really difficult to say whether it,” i.e., the pregnancy, “had any part therein or not.” If this statement be correct, and there is nothing in the history of the case to doubt it, then it would be as appropriate if a pregnant woman has pneumonia to designate it pneumonia gravidarum. The child was born at term, but was feeble, and died in thirty-six hours. Its skin had a deep-yellow tinge, and here and there upon the body and face there were streaks of dark and light green,—a condition

which is quite exceptional, for Lomer has shown that the coloring matter of the bile passes with great difficulty through the placenta.

Uterine Fibroids.—Porak observed a case of pregnancy complicated by a uterine fibroma; when labor occurred the cord prolapsed, and, the child dying, artificial delivery was necessary, the cephalotribe being used. Eight days after delivery the patient suddenly perished from thrombosis of the pulmonary artery.

John Phillips,¹⁵ in a paper on fibro-myomata complicating pregnancy and parturition, sums up the various methods of treatment as follows: 1. Induction of premature labor. 2. Forcible reposition under an anæsthetic. 3. Gradual hydrostatic pressure. 4. Enucleation per vagina. 5. Version, forceps, and craniotomy. 6. The varieties of abdominal section. No rules can be laid down for treatment in any individual case, but, irrespective of the operation indicated, there is always great mortality attending operative interference. Phillips cites a number of cases treated by version or by use of the forceps, the mortality by the former method reaching 55.5 per cent., while by the forceps it was as high as 66.6 per cent. and no lower than 22.2 per cent.

Erysipelas.—R. R. Kime⁶¹ reaches the following conclusions concerning erysipelas complicating pregnancy, based on an analysis of 37 cases: 1. The nearer to full term the attack of erysipelas, the less danger of death and the greater certainty of abortion or premature labor. 2. That nearly all cases complicated by puerperal peritonitis die, while those not thus complicated get well. 3. That there is less danger of death to the pregnant woman suffering with erysipelas in the latter months of pregnancy than to the parturient to whom erysipelatos virus has been conveyed, producing puerperal peritonitis. 4. That the dangers to the pregnant or parturient woman are greater in the active invasive stage of erysipelas; that puerperal septicæmia is not so likely to follow those cases of abortion or premature delivery occurring in the retrogressive stage of the erysipelatos inflammation; and that the danger grows less as the inflammation subsides, provided the system is not left in a condition favorable to the return of the erysipelas. 5. That the virus from all varieties of erysipelas should be considered dangerous to the parturient, regarding the intensity of the inflammation and time of development of the virus as greater factors for evil than the variety and situation of the erysipelas.

Pneumonia.—Stack²_{Oct.12} has reported a case of pneumonia occurring in a woman when between seven and eight months pregnant. Premature labor occurred; the child was dead, but the mother recovered.

Bradbury²_{Aug.10} gives an instance of pneumonia occurring in a woman near the end of pregnancy; labor occurred seven days after the beginning of the disease, a living child was born, and immediately after the breathing became less difficult, the fever lessened, and convalescence soon followed.

Campbell³⁹_{Aug.16} reports labor in a woman suffering with pneumonia; a living child was born, and the woman's temperature the day after delivery was 105.2° F. (40.67° C.), but in three days convalescence began; the secretion of milk was very scanty and soon ceased.

Netter⁶_{Apr.20} brought to the attention of the Paris Société de Biologie the history of a case of pneumonia, in which pregnancy had advanced to seven and a half months. The woman recovered, but premature labor occurred, the child living only five days. A post-mortem examination of the child showed pneumonia, with fibrinous pleurisy. To still further prove the possibility of the transmission of infectious disease from the mother to the fœtus, he inoculated a pregnant guinea-pig with a culture of the pneumococci found in the child, and these were found in the fœtus of the guinea-pig.

Gravido-Cardiac Lesions.—Peter¹⁰⁰_{Aug.11} considers some of the accidents that may occur to pregnant women who have organic disease of the heart, stating that every pregnant woman affected with a cardiac lesion should avoid carrying a heavy load, making violent efforts, and that she should rest during her pregnancy, as far as possible, in a horizontal position. Further, considering the gravidic plethora and the tendency to congestions from the condition of the heart, slight abstraction of blood should sometimes be made, either by bleeding, cupping, or by lowering the blood-pressure with laxatives.

Murray⁷⁷_{Jan.} in a paper read before the Obstetrical Society of New York, called particular attention to the danger to both mother and child where pregnancy is complicated with chronic valvular disease of the heart. The symptoms before and during labor are often of the gravest nature, and, even when the child is born, the heart of

the mother does not readily accommodate itself to the new order of things, and pulmonary œdema frequently supervenes. He advises against marriage for women suffering from chronic heart trouble, and he recommends that in cases where pregnancy exists, it should be arrested where advanced mitral trouble with pulmonary engorgement and dyspnœa are present; but even this course is not without its dangers. Tonics and digitalis should be given in cases where pregnancy continues, and when labor goes to term delivery should be as rapid as possible by the use of the forceps. The use of ether and chloroform are contra-indicated during the labor, owing to the danger of pulmonary œdema by employing the first and the depression to the heart by using the second.

Scarlatina.—Boxall,⁶⁶⁵ in reviewing the subject of scarlatina during pregnancy and the puerperium, reaches the following conclusions: 1. Scarlatina occurs almost invariably during the first week of the puerperium, its appearance at a subsequent period being rare. 2. In exceptional cases it may appear during pregnancy shortly before parturition begins. 3. Predisposition to infection is greater after parturition and during the first week of the puerperium. 4. If infection occurs during or just after parturition, the period of incubation will be very short. 5. During pregnancy the pharyngeal symptoms are not modified, but if the disease occurs after parturition angina is infrequent. Should parturition occur during the period of incubation it will follow its ordinary course, but the uterine pains will have a greater influence than usual upon the mental condition of the patient. If inertia is present, it will be during the last period of parturition. Should parturition occur during an attack of scarlatina, the pains will be weaker than normal, inertia will be present, and there may be a predisposition to hæmorrhage. The mammary secretion is almost always diminished, and may cease altogether on account of scarlatina.

Typhoid Fever.—Jaggard⁶¹ reported 2 cases of typhoid fever complicating pregnancy, one of which occurred in the ninth month. The skin of the child at birth was shriveled, and in a few days was covered with bullous spots, at first vesicular, then pustular.

Hysterocele Gravidarum.—Adams,²⁷ in an admirable paper on hernia of the pregnant uterus, gives a history of all cases on

record of this trouble, numbering 24, of which 10 were inguinal, 1 crural, 1 sacro-sciatic, 4 umbilical, and 8 ventral. In the umbilical cases the Cæsarian operation was performed six times, the Porro operation once, induction of premature labor once, and delivery was spontaneous once. In the crural case the Cæsarian operation was performed; in the inguinal, the uterus was supported in 2 cases, forceps applied in 1, and delivery was natural in 1; in the ventral, supports were used in 4 cases, and natural delivery occurred in 2. Of the Cæsarian operations performed, the mothers died in 5, while all the children lived. All the other cases cited resulted in recovery.

Tympanites.—Wicks⁶ reports a case of tympanites occurring in a woman six months pregnant, where, the usual remedies failing, and premature labor being threatened with the risk of the patient's life, the abdomen was punctured in four places with a medium-sized trocar, which relieved the distention, and rapid recovery took place, but premature labor occurred.

Syphilis During Pregnancy.—Fournier,¹⁵² in a series of lectures on syphilis occurring during pregnancy, believes that a non-syphilitic female can contract syphilis through the fœtus which has been impregnated with secondary syphilis by the father, on whom no primary sores are visible, notwithstanding that it has been denied because of its rare occurrence. This he demonstrated by cases in his clinic. The cases where mothers escape the contagion of syphilis from the child he believes are explained by the law of impressibility due to previous inoculation; that is, the mother must be of a syphilitic taint previous to conception if she escapes syphilis from the child impressed by the father.

Hydatid Mole.—McNutt¹⁴⁷ presented a specimen of hydatid mole, with accompanying decidua, at a meeting of the Medical Society of the State of California. The diagnosis of the case had been one of extra-uterine fœtation, and laparotomy was performed; but it was then found that the entire mass was within the uterus. The cervix was subsequently dilated and the mass removed.

Muscular Atrophy.—Desnos¹⁷,² describes a case of rapidly-developed muscular atrophy of the upper and lower extremities in a pregnant woman who was also suffering from uncontrollable vomiting. She had been exhausted by complications during her two previous pregnancies, and in the third pregnancy

the vomiting resisted all treatment. Toward the end of the fourth month the muscles of the lower extremities began to atrophy, and a few days later the arms were similarly affected. The temperature was subnormal and the memory weakened. The electrical sensibility of the skin and muscles was unimpaired. Premature labor was induced, and the patient made a protracted though complete recovery.

Ulceration of the Cervix.—Chrobak ⁸¹⁷_{Nov. 28} reports a case in which pregnancy was always complicated with induration and ulceration of the cervix, which disappeared when she aborted, as she generally did. Microscopical examination showed a new growth, probably syphilitic, from the stimulation of pregnancy.

Blindness During Pregnancy.—Fougeray and Fouchard ¹⁰⁰_{Sept. 21} report the case of a woman, six and one-half months pregnant, previously in normal health, except being somewhat hysterical, dyspeptic, and having occasionally attacks of ophthalmic migraine, who became entirely blind, vision leaving her gradually but rapidly. The attack of blindness was preceded by frequent vomiting for a period of five days. Examination with the ophthalmoscope revealed no lesion. The amaurosis lasted two days, when vision gradually returned, and in six days the patient's sight was completely restored. Twelve days later a 7 months' dead fœtus was expelled. In the placenta, otherwise normal, was found a tumor of the size of an egg, containing coagulated blood.

Varicose Veins.—A case of varicose veins, involving both labia minora and the entire vaginal walls is reported by J. M. Fort, ⁸⁵_{Dec. 18}, the labor terminating without any bad symptoms, slight pressure being made on the dilated vessels with a napkin during labor to prevent overdistention.

Œdema of the Vulva.—A case of marked œdema of the vulva during the last month of pregnancy is reported by N. S. F., of St. Johns, Newfoundland, ²⁸⁴_{Mar.}, which was readily relieved by numerous punctures.

Hydramnios.—Bar ²⁴_{Jan. 12} says that of 100 children born when pregnancies were complicated with hydramnios, 54 were more or less vigorous and healthy, 27 were still-born or died immediately after birth, 11 were twins, while 8 were monstrosities. He considers that the cause of hydramnios is, in most cases, pressure on the umbilical vein, the exception being usually where monstrosity

of the foetus coincides with the hydramnios, when he thinks that both foetus and amnion develop contemporaneously into their unnatural condition.

Walter Lindley²⁷ reports a case of hydramnios, with the birth of a monstrosity at term, and another case where the patient miscarried at seven months, the foetus being well formed.

Penney²⁷ attended a woman in her second confinement, complicated with marked hydramnios, who gave birth to triplets, the first and third born being normally developed, the former living an hour and the second still-born. The second birth was a monstrosity, in which there was an absence of head, arms, and thoracic and abdominal viscera, except the lower part of the small intestine, the large intestine, and the kidneys and bladder.

SURGICAL OPERATIONS DURING PREGNANCY.

The opinion of the majority of the profession is favorable to the performance of almost any surgical operation during pregnancy, providing the wound is kept aseptic. Mayo Robson² reports seven operations at various stages of pregnancy, the patients all recovering, and in no case did premature labor occur: carcinoma of breast in seventh month; ovarian cyst, with extensive adhesions to bowel and uterus, removed in tenth week; strangulated femoral hernia operated upon in third month, and ovariectomy in second month. Tiffany¹⁰⁴ has collated a number of cases, and considers that, while pregnancy does not contra-indicate a surgical operation, before any is undertaken the function of all the patient's organs should be carefully investigated and corrected. Gordon⁹⁹ removed a subperitoneal fibroid from the anterior wall of a pregnant uterus; the patient readily recovered, and at term a living child was born.

RETRODEVIATIONS OF THE UTERUS IN PREGNANCY.

A. Martin¹¹⁰⁷ presents the following conclusions: 1. The great majority of cases of retrodeviations of the uterus do not come to the knowledge of practitioners, but without notable difficulty are spontaneously rectified. 2. That the complaints of pregnant women as to the difficulty in urination indicates, probably, in the majority of cases, the diagnosis in which spontaneous reduction does not occur. 3. In case spontaneous restoration does not

occur, then an endeavor should be made to bring the uterus into normal position before the indications of severe incarceration are manifested. 4. In cases of incarceration reposition is always to be sought; emptying of the uterus should first be employed before extirpation is considered.

Sperber³¹⁷_{Nov. 30} cites a case of retroflexion and incarceration of the uterus at four months' pregnancy, where spontaneous reposition took place after an attack of uterine contractions lasting forty-eight hours. The labor went to full term without further complication.

W. S. Stewart,^{1046 80}_{Nov. 30; Mar. 30} in a paper read before the Ninth International Medical Congress on the importance of careful diagnosis of pregnancy, cites a case where a tumor, the size of an orange, occupying Douglas's *cul-de-sac*, was pronounced a fibroid growth, but was a retroflexed pregnant uterus. Labor went to full term with the displacement unreduced. The vertex presented, and nature was not interfered with until after the cervix was dilated, when, symptoms of exhaustion appearing, the knee-chest position was taken by the patient, and by bimanual assistance the fundus was pushed above the brim of the pelvis, and labor progressed without further delay.

C. O'Donovan, Jr.,¹⁰⁴_{May 19} attended a woman suffering from inability to pass the urine and with obstinate constipation, due to the presence of a retroverted uterus, which spontaneously acquired its normal position after many fruitless attempts had been made to replace it. The woman gave birth to a child at term.

Fraipont³¹⁷_{Sept. 19} quotes a case of acute prolapsus uteri, in a primipara in the fifth month of pregnancy, which was brought on by overexertion. It was accompanied with high fever and decomposition of foetus. Reposition could not be effected until three weeks after uterus was emptied.

EXTRA-UTERINE GESTATION.

Herman,⁶_{July 11} operated upon 2 cases of extra-uterine pregnancy at the London Hospital during the past year. In both cases, which were pregnant about two months, there was a history of frequent attacks of abdominal pain, accompanied with vomiting and faintness. Vaginal examinations showed the os uteri pushed forward by a soft and tender swelling posterior to it, the tumor increasing in size after the symptoms above referred to. In one case

laparotomy showed the left Fallopian tube ruptured and the peritoneal cavity containing blood-clots, but no fœtus was found, although there was unmistakable evidence of chorionic tissue noticed. In the second case, upon opening the abdominal cavity, a tumor was found behind the uterus, under the pelvic peritoneum, which contained a fœtus. The hæmorrhage was so troublesome after the removal of the fœtus that the sac was plugged with gauze. Attempts to remove the placenta twelve days afterward were followed by dangerous hæmorrhage. The time necessary for the complete separation of the placenta was seventy-four days. In a hæmatocele, suspected to be due to extra-uterine pregnancy, any augmentation in its size is considered by Herman as confirming the diagnosis, and as an urgent indication for operation. Where the first slight hæmorrhage has not killed the fœtus there is the risk that future dangerous hæmorrhages to the mother will occur.

Mantel^{7,12} reports a case of encysted tubular pregnancy in which false pains occurred at the ninth month of pregnancy, with the passage of a number of blood-clots, followed by shrinking of the abdomen. Shortly afterward a painless, hard, and immovable tumor was discovered above the pubes, lying crossways, with its extremities in the iliac fossæ. This was removed fourteen months afterward, and was found to be an encysted female fœtus, weighing 21 ounces (653 grammes), in a state of waxy-adipose degeneration, but comparatively well preserved.

Hirst¹⁹ called the attention of the Philadelphia Obstetrical Society to a case of probable rupture of a blood-vessel in the broad ligament closely simulating ruptured tubal pregnancy. Laparotomy was performed and the patient recovered.

MISCELLANY.

Composition of the Liquor Amnii.—Koettnitz,²²⁶ desirous of throwing light upon the albuminoid substances found in the amniotic fluid, made several accurate analyses, and found in the liquor amnii of young and more advanced ovi propeptone and peptone in considerable quantity, which led him to the supposition that the fluid was a nutrient to the fœtus. As comparatively more propeptone and peptone were found in the amniotic fluid of a young ovum than when nearer maturity, the writer assumes that in the former case liquor amnii as a nutrient is of

greater importance than toward the close of pregnancy. Concerning the source of the liquor amnii and its albuminoids, the author leans toward the hypothesis that the greater part comes from the mother through the placenta.

Faradization After Confinement.—Krasowsky²⁹⁹ practiced faradization of the uterus on 22 women after confinement. The poles of the battery were placed on the walls of the abdomen on both sides of the uterus, about where the neck joins the body. A gradually increasing current was used. It was found that the uterus contracted more rapidly and firmly than ordinarily, and he therefore recommends faradization where involution of the uterus is retarded or arrested.

Ovulation and Menstruation.—S. Chazan,⁹⁵ in a lengthy dissertation, concludes that the ripening and bursting of the Graafian vesicle is an independent act not connected with the menstrual period, and that it occurs even when, through some cause, menstruation does not take place; that ovulation is a constant performance not coincident with menstruation; that therefore an ovum is almost always in transit through the tubes and the uterus, and conception can take place at any time between the menstrual periods; that ovulation in the human being is not, as is the case in lower animals, limited to certain periodical manifestations; that the anatomical changes in the mucous lining of the uterus have nothing to do with the periodical flow of blood; and, lastly, that the former are influenced by ovulation, but not by the menstrual flow.

Influence of Pregnancy on Nutrition.—Auvard,¹⁰⁰ speaking of the influence of the puerperal state on nutrition in general and obesity in particular, says that gestation retards the four stages of nutrition, viz., absorption, assimilation, disassimilation, or rejection, and elimination, and it explains the troubles arising from them during that time. After the expulsion of the ovum, rest, and subsequently what the author calls regression, takes place in the organism, during which the activity of nutrition is resumed and the mischief produced by gestation is repaired. Lactation, while it allows the local processes of regression to proceed normally, modifies the condition of nutrition. Under its influence absorption and elimination appear more active, assimilation and disassimilation retarded. Lactation seems, therefore, to occupy the middle between gestation and simple regression; for, like gestation, it

retards assimilation and disassimilation, but, contrary to gestation, it assists absorption and elimination. Concerning obesity, it finds a productive and powerful cause in gestation; lactation seems to act similarly, while simple regression without lactation reduces obesity.

Protracted Pregnancies.—D. A. McTavish¹_{Apr. 11} reports a case of pregnancy lasting 318 days, the child being a female, and weighing at birth 12½ pounds. W. H. Murray²_{Feb. 3} attended a woman at the beginning of her pregnancy for morning sickness, in which pregnancy continued for 330 days. Mervin Maus, of the United States Army,¹_{May 11} reports a similar case which he attended two weeks after cessation of menstruation for vomiting, the pregnancy lasting 334 days. E. J. Abbott⁵⁰_{June 2} mentions a case where the last menstruation was on April 3d; symptoms of pregnancy were manifested on May 1st, marked quickening early in October; the woman was delivered of a healthy 10½-pound (5.25 kilogrammes) child April 20th,—more than a year after menses ceased and more than six months after quickening. Rowland Humphreys²_{Sept. 14} reports a case of 314 days' duration.

Early Marriages.—Rouvier, of Beyrouth, Syria,⁴⁸_{Mar.} after a prolonged residence in the East, where he says marriage is contracted regardless of puberty, makes the following conclusions respecting the effects of early marriages: 1. The absolute fecundity is diminished. 2. The proportion of abortions is increased. 3. Sexual intercourse and labor at too early an age favor the development of inflammations and displacements of the uterus and alterations in its shape.

Maternal Impressions.—The subject of maternal impressions has received a good deal of attention during the past year, and the opinions of a majority of the profession discussing the matter are that strong impressions made upon the pregnant woman may be shown in the child. W. S. Lowman⁵⁰_{Aug. 17} critically discusses the subject in an interesting paper giving the history and probable causes of such impressions. J. Wetherby⁵⁰_{Sept. 21} ably maintains that it is not a sufficient reason to disbelieve the possibility of maternal impressions because a scientific reason cannot be assigned for its cause. A. Ross Patterson,⁶_{Sept. 21} M. G. Lowry,⁵⁰_{Dec. 16, '98} J. N. B. Guinn,¹⁹⁹_{June} John Ringwood,²²_{Jan. 9} Frederick L. Classen,²¹⁶_{Dec., '98} and A. B. Leggatt⁴⁹_{Mar. 16} report cases where the child at birth showed unmistakable evidence

of impressions received from the mother during pregnancy. J. O. Lowrie²⁰²_{Mar. 11} does not believe in maternal impressions, criticising a number of the reported cases.

Double Placenta.—P. Lugeol¹⁸⁸_{Mar. 1} showed a specimen of double placenta, there being but one foetus. The two portions, about 1 inch (0.025 metre) apart, were nearly of the same size. The whole placenta weighed about 20 ounces (622 grammes). There are only five other double placentæ on record.

Placental Transmission of Bacilli.—C. J. Eberth⁸⁹_{Mar. 1} speaking of the theory that the typhoid germ is transferred from the mother to the foetus, relates several cases where the bacillus of this disease was cultivated in gelatin from parts of the liver, heart, blood, etc., taken from the foetus of a mother having suffered with typhoid fever. Critzman¹⁶⁴_{Mar. 17} after citing many authorities and experiments, concludes that the bacillus anthracis and some other bacteriæ, such as small-pox, tubercle, etc., are capable of penetrating the placenta and passing from the mother to the foetus.

Kufferath¹¹⁰⁹_{July 21} reports a successful case of the Porro operation in a woman with deformed pelvis, in whom the Cæsarian operation had been performed at her previous pregnancy. It was thought advisable to perform the operation for fear of rupture of the cicatrix in the uterus from the Cæsarian operation should labor go to full term.

Manley⁶_{Dec. 15, '98} attended a woman in her fourth confinement, at which she gave birth to a 7 months' child, the upper extremities of which were perfectly normal and healthy-looking, but from the hips down the lower extremities were completely gangrenous. It lived twenty-four hours. The woman's previous confinements had all been premature.

Florian Krug¹⁵⁰_{Mar. 1} relates an interesting case of the strangulation of a foetus in the uterus by the cord, and the retention of the dead foetus for nearly three months without material inconvenience to the mother. Natural symptoms of labor arrived at the usual time, and the dead and strangulated foetus was delivered without other complications.

OBSTETRICS.

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PHYSIOLOGY OF LABOR.

Determining Cause of Labor.—According to Girin,²⁸⁶ the liquor amnii obtains its maximum density during early pregnancy, when it is 1030. Its specific gravity then steadily diminishes until term, when it is nearly that of water. At first the specific gravity of the foetus is lower than that of the liquor amnii, but becomes steadily higher. The foetus, sinking to the os internum, excites uterine contraction by the reflex stimulation of pressure. This hypothesis rests upon the findings, as to the comparative densities of the liquor amnii and of the foetal body, of Preyer, Buniva, Vauquelin, Labruhe, Pinard, Gauthier, Mya, Graziadei.

The function of the membranes in labor is suggested by J. H. Emerson,¹ who reports a case of labor alleged to have been delayed by adhesions between the membranes and the uterus.

Dry Labor.—Examples of alleged premature rupture of the bag of waters at various long periods before the commencement of labor are recorded by H. R. Coston,¹ (interval of forty-five days), John Trumbull,⁵⁹ G. T. Thomas.⁹⁵ An example of alleged bloodless labor, in other respects physiological, is recorded by B. J. Wetherby.⁵⁹

Absence of Foetal Heart-Tone in Normal Labor.—M. Bar²⁴ records a case of vertex presentation, O.D.A., in which repeated auscultation failed to reveal the foetal heart-beats, although foetal movements were active and the infant was born alive. The negative result of auscultation received a highly probable explanation in structural anomalies of the heart in the presence of ascites.

Extension of the Foetus During the Second Stage of Labor.—According to recent observations by German obstetricians, the advance of the foetal head during the second stage of labor occurs as the result of extension of the foetal body and the consequent

elongation of the long axis of the foetal body ; “ not by pressure of the uterus on the foetal breech, driving it down, but by the pressure of the uterus around the foetus, straightening it out.” Litzmann⁸⁵₁₈₉₂ noticed that during a pain the fundus uteri reached higher than during relaxation. In 17 cases, “ in which, up to the time at which the head was distending the perinaeum, the fundus uteri occupied the same position with respect to the umbilicus as at the beginning of labor,” Schroeder and Stratz found that the distance between the breech and the vertex with the spine flexed is less by more than 2 inches (5 centimetres), on an average, than that with the spine extended, and that the difference between these measurements may exceed 4 inches (10 centimetres). Accordingly, in labor, the head may advance to this extent, while the breech remains stationary, if extension of the foetus takes place. Now, they have shown that this extension does occur ; that the distance between the breech and the vertex increases during the passage of the head through the pelvic cavity by an amount such as extension of the trunk would account for. This extension is explained on the hypothesis that during the second stage of labor the contraction ring is drawn up over the flexed foetal body, and the child can only pass this ring by becoming extended. Hoffheinz⁸⁶₁₈₉₃ in 100 cases, measured the distance between the upper border of the symphysis pubis and the fundus uteri. He found that the distance between these points was actually a little longer when the head was distending the perinaeum than when it was at the brim. Hoffheinz explains the extension of the spine by the contraction of the uterus in all its dimensions, the resistance to the advance of the child causing the contracting uterine body to pull up the cervix uteri ; and this resistance, together with the extension of the child, causes the body of the uterus to be pushed higher up at the time when resistance is greatest—that is, when the perinaeum is on the stretch.

G. Ernest Herman and Charles Goulet,⁸⁷_{Oct. 12} after a succinct statement of the literature of the subject from which this account is taken bodily, recorded the measurements of 22 cases (20 vertex, 2 breech) in the General Lying-in Hospital of London. All the measurements were made with callipers from the upper border of the symphysis pubis to the fundus uteri during the intervals of pains. The first measurement was taken when the presenting part

was engaging at the brim, the second when distending the perinæum. The difference was found in no case to exceed $\frac{1}{2}$ inch (13 millimetres), and in the large majority of cases there was no difference at all. "These measurements, taken with those quoted from other writers, justify the assertion that, whether the head or the breech be the presenting part, extension of the foetal spine is a constant and essential part of the mechanism of labor."

Anterior Rotation.—Frommel,⁴ takes exception to Olshausen's statement that anterior rotation of the occiput is initiated by forward rotation of the trunk; he has observed anterior rotation of the occiput before the same movement of the trunk, and thinks it impossible for the latter to be the cause of the former. In this view he is supported by Schatz. Upon the other hand, Hofmeier and Schwarz uphold the doctrine of Olshausen. Schwarz asserts that the undoubted value of the lateral posture in occipito-posterior positions consists in the impetus given to forward rotation of the trunk, and, therefore, of the occiput.

Labor After Extirpation of the Sacrum.—Lihotzky²⁸² attended a woman in labor upon whom Kraske's operation for cancer of the rectum had been successfully performed. She recovered her health after the operation, became pregnant, and gave spontaneous birth to a living child weighing 9 pounds. The absence of the sacrum and of the muscles and ligaments of the pelvic floor did not at all interfere with the forward rotation of the occiput, nor with the normal mechanism of labor.

Delivery of the Shoulder.—Leonet¹⁰¹⁰ asserts that the anterior shoulder first disengages in 90 out of 100 cases, if the head is not supported; but if the head is supported, the posterior shoulder first emerges in 90 out of 100 cases. Disengagement of the posterior shoulder first threatens the integrity of the perinæum.

Function of the Levator Ani.—Dickinson²⁷ has studied the anatomy and function of the levator ani muscle by introducing cylinders of modeling wax into the vagina, and having the patient contract the muscle by straining. He concludes that the distance from the introitus vaginæ to the inner edge of the levator averages less than $\frac{1}{2}$ inch (1.2 centimetres). The double band of the muscle is always sharply defined. The more the levator is stretched, the closer the strong edges of the horizontal belly are brought together. Contraction of the muscle crowds the penis against the cervix

during coition; the vaginal outlet remains quiet, while the upper portion rises 15° or 20° toward the brim. According to the dynamometer test the average strength of the muscle was 10 pounds (5 kilogrammes), occasionally 27 pounds (14 kilogrammes). Dickinson has collected 6 cases in which labor is alleged to have been delayed by spasmodic contraction of this muscle.

Function of the Coccyx.—Henry D. Fry²⁷ seeks to prove the theory that the function of the coccyx is to oppose the descent of the brow, thus forcing down the occipital end of the lever beneath the symphysis; in other words, to produce extreme flexion of the head at the pelvic outlet.

Mechanism of the Stages of the After-birth.—H. St. Clair Gray² attaches great importance in placental separation to the formation of the retroplacental clot, the increase in the size of which is due to the rupture of utero-placental tissue consequent upon the engorgement of the after-birth after ligature of the cord. He supports his proposition by observations upon the size of the clot with and without ligature of the cord. When the cord is not ligatured, when the placenta is aspirated, the retroplacental clot is small or even absent; it is present, and of large size, when the cord is ligatured; that is, when the placenta is kept full of blood from the maternal body.

T. Arthur Helme³⁸ records an observation on the mode of placental separation in the case of the retention of one placenta and its manual detachment in a twin labor. "The non-aspirated placenta was spontaneously detached by uterine contractions after the failure of uterine relaxation. The aspirated placenta was not spontaneously detached, and relaxation failed to detach it; but contraction separated the lower border, and then was absent, so that artificial detachment became necessary. The case was cited in evidence against the mode of placental separation urged by Berry Hart. The gist of Hart's extraordinary hypothesis is that the placenta separates in the relaxation following a pain. In the discussion that followed Helme's communication, Simpson, Foulis, Craig, and Freeland Barbour agreed with the author that separation of the placenta during and in consequence of the relaxation after a pain was not a fact. D. Berry Hart³⁶ replies to Helme's paper, and claims that his (Helme's) case is really an example of the operation of his (Hart's) mechanism of placental separation.

Wilhelm Zinsstag⁹⁵_{B.M.B.} concludes an interesting study of the mechanism of the physiological separation of the placenta as follows: 1. The expectant plan of treatment of the stage of the after-birth, as recommended by different investigators, and as contrasted with Credé's procedure, has the great disadvantage that it exposes the parturient to losses of blood that may increase to a perilous degree; further, there is the no less serious objection that it is demanded of midwives that they be familiar with both procedures, and be capable of adopting the right plan at any given moment. 2. The objection urged against Credé's procedure, that it conduces to retention of the membranes and to subsequent puerperal febrile diseases, is not justified, since, upon the one hand, retention of the membranes occurs with equal frequency under both methods; on the other hand, childbed fever usually makes its appearance when there has been no retention of membranes whatever. 3. The Schultze mechanism is not the physiological mode of separation and of expulsion of the placenta, but it is artificially produced by intentional or unintentional traction on the cord. 4. When traction on the cord is eliminated by section of the organ after the birth of the child, Duncan's method is the natural and more frequent; however, the author does not advise immediate section and ligation of the cord as a routine procedure. 5. The retroplacental hæmatoma, regarded by Ahlfeld as a necessary condition to the separation of the placenta and membrane, is superfluous, since in 47.9 per cent. of the cases of Duncan's mechanism the membranes contained no blood, while in 52.1 per cent. of the cases of Schultze's mechanism the sac of membranes was often free from blood. In reply to Zinsstag,⁹⁵_{B.M.B.} Ahlfeld³¹⁷_{Apr. 18} gives the results of the expectant plan in the treatment of the stage of the after-birth, at the Marburg Obstetrical Klinik, 1888, 304 deliveries at or near term; in 249 cases, 82.4 per cent., spontaneous termination of the stage of the after-birth within one and a half hours after the expulsion of the child; in 31 cases, 10.4 per cent., expulsion before this period. So that in 280 cases, 92.7 per cent., the expectant plan was perfectly successful, and only in 22 cases, 7.3 per cent., was it necessary to resort to other means. The average loss of blood in the cases that terminated without interference was 389.5 grammes (12½ ounces). Massage and occasionally the vaginal douche of cold water were the only measures adopted

in hæmorrhage; neither ergot nor hot-water irrigation was used. Zinsstag fixes the average loss of blood in his cases at 1258.6 grammes (4 ounces); which Ahlfeld ascribes to the faulty manner in which he carried out the expectant plan of treatment. Ahlfeld's results during the year 1888 correspond closely with those obtained during 1885 and 1886.

OPERATIVE OBSTETRICS.

Substitute for the Induction of Premature Labor.—It is proposed by L. Prochownick³¹⁷ to substitute the induction of premature labor in cases of contracted pelvis by dieting the mother during the latter months of pregnancy, so that the development of the fœtus is influenced. In 3 cases of contracted pelvis, in which both craniotomy and the induction of premature labor had been repeatedly performed, yet without saving the children, Prochownick, under the limitation of diet to that of a diabetic and the restriction of fluids, succeeded in delivering the women at term of living children, lean but healthy. The bones of the children were not affected, but the deposition of fat was prevented. The diet in all 3 cases was: Morning, one small cup of coffee, 25 grammes (6 drachms) Zweiback; noon, all kinds of meat, eggs, and fish with very little sauce, some green vegetable cooked without fat, salad, cheese; evening, the same with 40 to 50 grammes ($1\frac{1}{2}$ to $1\frac{1}{2}$ ounces) of bread, and butter *ad libitum*. Forbidden: Water, soups, potatoes, pastry, sugar, beer. Drink for a day, 300 to 400 cubic centimetres (10 to $13\frac{1}{2}$ fluidounces) of red or Moselle wine.

Methods for Induction of Premature Labor—Hegar's Dilators, Large Size.—Arthur H. N. Lewers⁶, recommends the induction of premature labor by means of Hegar's dilators of large size. He has had constructed specially large sizes, running from No. 36 to No. 40, which is $1\frac{3}{4}$ inches (5 centimetres) in diameter. He reports 3 cases, in one of which labor was induced by this means after the failure of Krause's plan. Barnes's bags may or may not be subsequently used, according to the conditions of the case. After dilatation by Hegar's dilators, he is in the habit of rupturing the membrane.

Intra-Uterine Injection of Hot Carbolized Water.—Mon-dot⁷⁸_{Aq. 17} proposes the intra-uterine injection of 10 litres (10 quarts)

of hot carbolic-acid solution (1 per cent.). Out of 7 cases of severe eclampsia he reports 2 deaths.

Intra-Uterine Colpeuryxis.—Champetier de Ribes⁵ has devised a rubber bag that can be distended to the size of the foetal head. It is firmer in texture than Barnes's or Tarnier's dilators. When fully distended, balloon and tube form a cone the base of which is in the lower uterine segment. He has used this plan in 18 cases, 14 of which were cases of pelvic contraction of minor degrees. Spontaneous expulsion of the balloon occurred in less than twelve hours, and labor either terminated spontaneously soon after or was easily completed by operative interference.

Vulliet's Intra-Cervical Tamponade of Iodoform Gauze.—Dölger,⁵ reports 2 cases of contracted pelves, in which labor was induced by Vulliet's method of the intra-cervical tamponade with iodoform gauze. E. Chenevière¹⁵⁷ cites 3 cases in which the same method was used.

Forceps.—Samuel Sloan² describes an antero-posterior compression forceps for application at the brim of flat pelves as an alternative to craniotomy. The clinical evidence in favor of the instrument is entirely insufficient to warrant any criticism upon the subject at present. Henry D. Fry⁶¹ urges the use of antero-posterior forceps when the head is delayed at the inlet. Assalini's forceps is not yet an obsolete instrument; witness numerous allusions in the British press and a particularly good paper by G. Cadogan-Masterman.²⁶ From Münchmeyer's interesting account,⁹⁵ of the forceps operations at the Royal Frauen Klinik in Dresden, from September 1, 1883, to December 31, 1888, we translate a few concluding sentences:—

1. Out of 7322 labors 206 (2.8 per cent.) were terminated by the forceps, 187 typical forceps to the head low down in the pelvic cavity, 19 atypical forceps to the head at the inlet. Out of 7 dead mothers (total mortality, 3.4 per cent.) none perished on account of the operation; 119 (57.7 per cent.) suffered considerable injury of the soft parts; 141 (68 per cent.) were without fever, 20 (9.7 per cent.) had slight fever, but were discharged on the twelfth day; 45 (21.8 per cent.) had high fever; 7 (3.4 per cent.) had demonstrable parametritis. Out of the 206 children, 35 (17 per cent.) died, yet only 25 (12 per cent.) as the result of the forceps; 171 (83 per cent.) were dismissed alive. Out of the 19 high-forceps

operations no mother perished, 8 (42 per cent.) had fever; of the 19 children 5 (21 per cent.) died, several suffered severe injury. 2. It is necessary to bear in mind that the forceps is the bloodiest obstetric operation in consequence of the lacerations caused by the instrument. 3. It is necessary to bear in mind the familiar conditions of this operation. The high-forceps operation should be avoided as far as possible; it should only be practiced by the expert hand after an accurate estimate of all the dangers involved. 4. Even in cases of "easy" forceps, significant tears of the vagina and cervix may occur without injury to the perinæum; these tears may even cause fatal hæmorrhage. 5. Accordingly, it is necessary to limit the indications for this operation. Out of 1387 deliveries of the year 1887, only 27 cases occurred; out of 1360 of the year 1888, only 25 took place. 6. In the severe hæmorrhage after the forceps that is not stopped after the delivery of the after-birth and by the customary means, it is necessary to remember the possibility of a vaginal or cervical tear, to seek out the tear and close it by suture. In these cases Naegle's forceps was used, and the axis-traction instrument was not used at all.

Forceps to the After-Coming Head.—The prompt application of the forceps to the after-coming head is urged by Travis Carroll,^{53 Jan. 14} and H. C. Coe.^{50 Jan. 15}

Forceps in Relation to Idiocy.—Winkler and Bollaen^{317 No. 24} report their findings in two autopsies upon idiots, in whom cerebral atrophy is alleged to have followed pressure by the forceps. Examination of the heads of 25 living idiots showed the marks of pressure on both sides of the cranium in 6. General, well-marked cerebral atrophy was found in 1 case examined after death; the indentation of the skull was $1\frac{1}{2}$ inch (2.1 millimetres) deep and 1 inch (2.5 centimetres) wide. David de Beck^{152 Sept. 7} describes a case of atrophy of the optic papilla consecutive upon delivery by the forceps. On the other hand, Fletcher Beach^{6 Jan. 15} pertinently remarks that not the use of the forceps but the prolonged and difficult labor is the chief cause of idiocy in such cases as those attributed to the forceps by Winkler and Bollaen. Out of 810 cases of idiocy only 35 (4.3 per cent.) were said to be due to the application of the forceps, while 216 (26.6 per cent.) were due to prolonged or difficult labor. In this opinion J. Langdon Brown^{6 Jan. 15} fully concurs.

Forceps Applied to the Breech.—Charles W. Townsend^{99 Oct. 3}

reports a case of successful delivery of the breech by cephalic forceps. In this case the indication seems to have been uncommonly clear: tetanus uteri after a protracted first stage. J. Stedman has also successfully delivered the breech by the aid of forceps. Examples of successful application of the forceps in pelvic presentations are recorded by N. King.⁹⁸

Version—Prophylactic Version in the Contracted Pelvis.—Nagel⁹⁵_{B.M.B.1} compares 60 cases of version and extraction with 20 cases of forceps delivery in contracted pelves. His conclusions favor version and extraction. Out of his 60 cases of version no mother was lost, and 46 out of 61 children were saved. Out of 20 forceps deliveries maternal mortality was 20 per cent., morbidity 50 per cent.; foetal mortality 15 per cent., morbidity 20 per cent. The smallest true conjugate in which forceps was used was 3.7 inches (10 centimetres) in the *klinik* and *poliklinik* of the Charité under the direction of Gusserow. • It is a familiar fact that James T. Simpson (1847) urged the substitution of the high-forceps operation in contracted pelves by version and extraction, and that Gusserow has become one of the strongest advocates of the measure.

Alfred Dürrssen,⁴⁷⁵_{7th} on the treatment of the contracted pelvis, recommends, in generally-contracted pelves, version and extraction in case of presentation of the posterior parietal bone, prolapse of the umbilical cord after failure of manual reposition, and transverse presentation (Litzmann), but in all other cases an expectant attitude. The high-forceps operation can be greatly facilitated by lateral incisions of the *introitus vaginae* and of the vaginal portion. These incisions, made under antiseptic precautions and subsequently united, involve no risk to the mother, while they will greatly limit the number of cases in which craniotomy on the living child is now performed. Induction of premature labor is indicated when former labors have terminated in the birth of dead children. The indication for Cæsarean section in these cases is relative in the highest degree, since, when the choice lies between perforation of the living child and this operation, the indication is commonly threatened rupture of the uterus, and the prognosis of Cæsarean section is much more unfavorable than when done at the beginning of labor. As concerns the choice between induced labor and Cæsarean section, the facts that the maternal prognosis is absolutely and the foetal relatively good in the former operation, and that the mortality of

Cæsarean section is still 17.9 per cent., decide in favor of the artificial interruption of pregnancy.

While recommending a rather expectant attitude in the treatment of the generally-contracted pelvis, as compared with Litzmann's views, Dührssen advises active interference in the far more common flat pelvis. In the fourth degree, Cv. 5.5 centimetres—2 inches (Litzmann), Cæsarean section under the absolute indication; in third degree, Cv. 5.5 to 7 centimetres—2 to 3 inches (both fourth and third degrees fortunately uncommon), perforation, or Cæsarean section under the relative indication, with the weight of opinion in favor of the former; in the second (Cv. 7 to 8.5 centimetres—2.7 to 3.3 inches) and third (Cv. 8.5 to 9.5 centimetres—3.3 to 3.7 inches) degrees, induction of premature, Gusserow's prophylactic version and extraction. As a method of extraction, Dührssen warmly extols A. Martin's plan, and claims that it fully substitutes Tarnier's forceps, praised by Bumm. When the conditions are unfavorable for immediate extraction, Dührssen advises lateral incisions of *introitus vaginae* and os externum.

Cephalic Version Eighteen Hours After Rupture of the Membranes.—W. Clayton Dukes⁵⁹ reports the following case: Patient seen for the first time sixteen hours after rupture of the membranes; entire prolapse of left arm, shoulder firmly engaged, head forced backward over left scapula, face looking to the right. Violent contractions, tonic in character, possibly due to ergot given by midwife. The patient was thoroughly anæsthetized, and the child's forearm was flexed upon the arm, which was used as a fulcrum, and pressed backward and upward as gently as possible until it was returned into the vagina, when it was rotated and passed gently backward beneath the child to its normal position at the side. The head was gently rotated and brought into normal position. One or two pains effected the expulsion of the foetus. In this case the feet could not be reached on account of the tonic contractions of the uterus.

S. T. Yount⁷⁷ records a case of neglected transverse presentation with prolapse of foot, funis, and arm, in which he was finally enabled to turn by the insertion of one finger into the foetal anus, while he manipulated the head with the other hand.

Craniotomy.—Archibald Donald² read a paper, entitled "Methods of Craniotomy," before the Obstetrical Society of Lon-

don, that elicited a lively debate. Donald said that in the less marked degrees of pelvic contraction the method to be selected depended greatly on the nature of previous attempts at delivery. If the axis-traction forceps had been used to the limits of safety, and the head did not come through, the vertex might be perforated without removing the forceps, and the forceps used as a tractor after a firm grasp of the head had been obtained by turning the screw as far as possible. The method recommended in the higher degrees of pelvic contraction consisted in (1) podalic version and extraction of the body; (2) perforation through the roof of the mouth; (3) cephalotripsy of the after-coming head, and (4) extraction of the head by means of the cephalotribe, or by traction on the body or lower jaw combined with supra-pubic pressure. Galabin, Herman, W. Duncan, and Braxton Hicks,² expressed themselves in favor of Braxton Hicks's cephalotribe, as compared with the cranioclast, as an instrument of extraction of the after-coming as well as the fore-coming head. John Philips,² reports 16 successful cases of craniotomy performed under various indications, in 10 of which the child was probably alive before the operation.

Cephalothrypter or Cranioclast.—The spirited discussion on the relative merits of the cephalotribe and cranioclast, probably instigated by Credé,⁹⁵ has assumed during the year an international character. Zweifel¹¹⁶ declares himself in favor of Busch's cephalothrypter as an instrument of extraction when the os is dilated; and reports a case of extreme pelvic contraction (Cv. 4.25 to 4.50 centimetres—1.6 to 1.7 inches) in which he was able to deliver the head within two minutes after the failure of three competent physicians to extract the head with Braun's cranioclast after a trial of half a day. He is of the opinion that Busch's cephalothrypter is a better instrument than Breisky's on account of its greater length and pelvic curve. To the statistics of craniotomy, Zweifel contributes the following data: 1883 to 1888, Leipzig Poliklinik, 3683 labors, 55 craniotomies, 3 deaths (2 from rupture of uterus before operation, 1 from eclampsia, 0 due to operation itself); same period, Leipzig Obstetrical Klinik, 3455 labors, 18 craniotomies, 2 deaths, both due to eclampsia. The maternal mortality due to craniotomy itself in the 68 cases, for which the *klinik* was responsible, was zero. Zweifel adds that he himself has never lost a case of craniotomy.

Auvard²⁸⁶_{June} seeks to combine cephalotribe and cranioclast in an instrument which he designates "combined 'cephalic embryotome.'" Bar⁸_{Mar. 27} presented to the *Société de Médecine* a modification of Tarnier's basiotribe.

Craniotomy vs. Cæsarean Section.—Probably the most significant contribution to the literature of the subject, during the year, is to be found in the brochure by Egon Braun v. Fernwald and K. Herzfeld.^{1245; 317}_{May 4} The material is drawn from Carl Braun's *klinik*, and includes the period 1880 to 1887 (23,911 labors). Our space permits mention only of the conclusions relative to Cæsarean section: 1. Craniotomy on the living child can be substituted by Cæsarean section, under the relative indication, only when the mother elects the operation that will save the child. 2. Since so many well-developed children are spontaneously delivered, and since just as many are delivered by version and the forceps, when the *conjugata vera* is at or over 8 centimetres (3.1 inches), the limit for the relative indication of Cæsarean section cannot be willfully stretched out; so that Cæsarean section with a conjugate of 8.5 centimetres (3.3 inches) or over is a daring play with the life of the mother in favor of the child. 3. Further, with a *conjugata* over 8 centimetres (3.1 inches), craniotomy is the operation of election when it is not possible to extract a living child without danger to the mother, or when the prospect of saving the child's life has disappeared. 4. Conservative Cæsarean section, therefore, can substitute craniotomy only in the rarest cases. 5. When, in the concrete case, the choice lies between Cæsarean section and craniotomy, it is best, even when the parturient desires Cæsarean section, to perform craniotomy, and to inform the patient that she must have premature labor induced at a definite time in her next pregnancy. By this plan her life is not placed in jeopardy, and she is still in a position to bear children. The prospect of pregnancy after conservative Cæsarean section, according to present returns, is not great. 6. Porro's operation is indicated by absolute contraction of the pelvis, osteomalacia, and in those septic cases in which Cæsarean section is indicated on account of pelvic contraction.

Grapow's (Strassburg)³¹⁷_{Oct. 19} conclusions with reference to the treatment of the contracted pelvis are substantially in accord with Braun's.

Edward Reynolds⁹⁹_{Mar. 29} records a case of craniotomy in the first

labor of a patient with an extreme justo-minor pelvis (diagonal conjugate, 4 inches—9 centimetres), and of the induction of premature labor at the thirty-sixth week in her second pregnancy, with favorable results.

Decapitation.—Richard Stein⁵⁹_{Dec. 22, '96} reports a successful decapitation with Carl Braun's blunt hook in a case of neglected shoulder presentation. Thomson⁶⁰_{July '95} reports 3 successful cases of decapitation in neglected shoulder presentation,—1 by Braun's blunt hook, 2 by Schultze's sickle-shaped knife. He thinks that when the child's neck is small and accessible Braun's hook is the best instrument; when the neck is large and inaccessible Schultze's sickle-shaped knife is preferable. Thomson, according to Davis,⁵_{Nov.} finds that Carl Braun's blunt hook is an efficient decapitator when the foetus is small, but that Schultze's sickle-shaped knife is the best instrument when the child is large. Thomson has successfully used Schultze's knife in 11 cases. Budin¹²²_{Nov.} prefers the embryotome of Tarnier. This instrument is essentially a Braun hook furnished with a knife concealed in a groove. Narich⁷³_{Oct. 19} has invented a new embryotome which he has used in 13 cases.

CÆSAREAN SECTION.

Indications.—Leopold⁹⁶_{Aug. 22, '91} adds 8 Cæsarean sections to the 23 already recorded. Up to date he has performed conservative Cæsarean section in 25 cases on account of absolute or relative pelvic contraction, and has lost 2 cases—a mortality of 8 per cent. The operation was performed under the *relative indication* (that is, when the choice of operation was between Cæsarean section and craniotomy) in 22 cases—a mortality of 9 per cent. Ninety-nine cases of craniotomy have been recorded in the Dresden Frauenklinik, of which 7 (7.0 per cent.) terminated in death; but in 2 cases the cause of death was eclampsia, in 1 rupture of the uterus, in 1 placenta prævia, in 3 septic infection before admission. The *klinik*, therefore, is responsible only for 92 cases that terminated in recovery. After calling attention to the gross errors in Caruso's premises, Leopold compares conservative Cæsarean section under the relative indication with craniotomy under the same indications, as shown in the records of the Dresden Klinik, as follows:—

“Twenty-two conservative Cæsarean sections, under the relative indication, 2 mothers dead. Mortality, 9 per cent.

"Twenty-two perforations and subsequent extractions of the head in generally-contracted pelves, with a conjugata vera of 7.5 centimetres (3 inches) or less, and children living. No mother dead. Mortality, 0 per cent."

He concludes the very interesting paper mentioned in the following words: "After all this, it must be admitted as an unshaken fact that laparotomy is a much more dangerous operation than craniotomy. And since the life of the mother stands far higher than the life of the child, every man, before determining upon Cæsarean section, must bring it pointedly before his soul that in perforation he can make use of the present natural passages of the cervix and vagina, while in Cæsarean section he must make two new, altogether unnatural openings,—that of the abdomen and that of the uterus,—which must be closed again, and upon the union of which depend the health and life of the individual as well as the weal of her family." Leopold further alludes to Carl Braun's results¹²⁴⁵ in confirmation of the statement that, turn and twist statistics as one will, the fact remains that the very much greater number of mothers saved up to the present lies on the side of perforation. He recognizes, however, the right of the mother to decide which operation shall be performed. Braun's statistics, just mentioned, include the years 1881 to 1887: 51 craniotomies on account of pelvic contraction, with 1 death, 1.95 per cent.; 163 spontaneous labors in contracted pelves, 0 per cent. mortality; 54 inductions of premature labor, 0 per cent.; 78 atypical forceps operations, 1.29 per cent.; 89 versions, 0 per cent.

Piskaček^{Mar. 16, 8} adds a valuable contribution to the question of the indication in Cæsarean section as well as to the case-record. The material is drawn from Breisky's *klinik*, and, Piskaček's conclusions may be regarded as in a measure expressive of his teacher's views. Some of these propositions briefly are: 1. In I-paræ with cephalic presentations, version on account of pelvic contraction is contra-indicated, while in multiparæ this operation should be performed only when the conditions are favorable; that is, intact bag of waters, wide and dilatable os externum, mobile head, absence of stretching of the collum uteri. (There is always wanting, in such cases of version, the counter-proof, whether the labor with the fore-coming would not be as favorable to the child.) 2. The loss of children through perforation is eliminated in the course of

years through the possibility of saving the children of subsequent pregnancies by the induction of premature labor, without counting in the loss of mothers by Cæsarean section (12.94 per cent., Caruso) for Cæsarean section. 3. The relative indication is recognized when conditions of the operation are present, and when the mother elects the operation, especially in multiparæ whose previous labors yielded bad results. In primiparæ conservative Cæsarean section is recognized under this indication only when labor has begun and when rupture of the uterus threatens. In all other cases perforation of the living child is not only indicated, but is the obstetrician's duty. Five successful cases of Porro's operation, under the absolute indication of either osteomalacia or rachitis, and four examples of conservative Cæsarean section, under the relative indication, with termination in recovery, are also recorded. All told, eleven successful Porro operations have been performed by Breisky and his assistants.

Is conservative Cæsarean section sometimes indicated, after the failure of version, when the fœtus is living? This question was discussed before the Obstetrical Gynæcological Society of Vienna, ⁸⁴_{Feb. 3}, and was conditionally answered in the affirmative by Gustav Braun. Fritsch ⁸¹⁷_{June}, has practically rehabilitated the classical method of Cæsarean section (1) by the substitution of the simple, interrupted suture passed through all the tissues,—peritoneum, muscularis, decidua,—for Säger's sero-serous suture, and (2) by the omission of the disinfection of the cavum uteri,—presumably in an aseptic state before the commencement of and in the early stage of labor. Fritsch reports 2 cases in which this procedure was successfully carried out. There remains, of the Säger operation, then, only the preventive compression of the cervix uteri by the rubber tube.

From experiments on bitches and an ape, Veit ⁸¹⁷_{July 16}, concludes that union of the incised peritoneum occurs through new formation when the musculature is accurately apposed. In the symperitoneal suture of Säger he recognizes the same mode of union as when the peritoneal edges are approximated after the linear manner. The time of election for Cæsarean section is after the occurrence of uterine contractions. Leopold recognizes the difficulty of the operation to consist not in the mode of suture, but in the accurate apposition of the edges of the wound. In a successful case, C. J. Müller ⁸¹⁷_{Sept. 28} made the uterine incision in an antero-posterior

direction through the fundus in order to avoid the placenta and the lower uterine segment. H. Thomson,^{317 No. 24} from experimental investigation with different suture materials, concludes: 1. Silk is the safest and best suture material, because it can be made perfectly sterile and because in time it is absorbed. 2. Chromic-acid gut, silk-worm gut, or silver wire ought not to be used, because they are not absorbed. 3. Carbolic-acid gut, like every other variety of catgut, ought not to be used on account of the danger of infection; carbolic-acid gut, besides, cannot be used in large intra-peritoneal wounds, since it undergoes too rapid resorption.

To prevent subsequent conception various devices have been practiced. Thus, Falaschi,^{2 No. 22} and Bouilly,^{22 No. 27} placed a double ligature around the uterine end of each Fallopian tube. Champneys,^{2 Apr. 18} tied and cut through both tubes with kangaroo tendon.

Cases.—Wolcynski,^{8 No. 27} reports 2 successful Cæsarean sections, after the method of Säger, under the indications, respectively, of a flat rachitic pelvis and of an osteomalacic pelvis. Stanislaus Braun, of Krakau,^{95 B.M.B. 1} reports, out of Madurowicz's *klinik*, a Cæsarean section (1870) after the old method, on account of a large neuroma of the right ischiatic nerve, with fatal termination to the mother; a successful Porro operation (1888), on account of generally-contracted and flat pelvis (Cv. 6 centimetres—2.36 inches); a successful Säger operation (1888) under the same indication (Cv. 8 centimetres—3 inches); 2 post-mortem sections, the one on account of rupture of the uterus, the other purulent leptomeningitis and pulmonary oedema; in the latter case the child was delivered alive, but afterward died of pulmonary atelectasis.

Additional cases reported are found in the subjoined table.

Van der Mey,^{57 Aug. 11} reports 4 successful cases of conservative Cæsarean section under the absolute indication. In one case the operation was performed twice on the same patient. During the second operation, there was "no trace of a cicatrix in the wall of the corpus uteri; apparently, the uterine wound had healed with complete restitution of the organic continuity of the divided tissue." Adhesions between the visceral and parietal peritoneum were present.

Porro's Operation.—Braucamst,^{317 No. 22, 23} reports a case of twin pregnancy, complicated by carcinoma of the cervix, in which Porro's operation was successfully performed and the cervix

CAESAREAN SECTION.

[illegible]

inverted through the os externum into the vagina. Originally suggested by Blundell, this procedure has been repeatedly brought forward in recent years as a new operation, among others by Chalot (1883), John Bartlett (1886), and Frank (1881).

The following cases of Porro's operation are recorded:—

PORRO'S OPERATION.				
			Mother.	Child.
D. BERRY HART	British Medical Journal, January 26th.	{ VI-para	{ Contracted pelvis, Cv. { Porro . . . Recovery . Living.	
			6 centimetres.	
W. SUTUGIN	Centralblatt für Gynäkologie, February 8th.	{ I-para	{ Contracted pelvis, Cv. { Porro . . . Recovery . { Death on	
			{ metritis septico.	{ fifth day.
A. L. GALABIN	British Medical Journal, February 16th.	{ I-para	{ Contracted pelvis, Cv. { Porro . . . Recovery . Living.	
			7 centimetres.	
MARIO GOMMERI	British Medical Journal, March 22d.	{ (?)	Rachitic pelvis Porro . . . Recovery . Living.	
KUPFERATH	Journal d'Accouchements, July 30th.	{ II-para First child by Caesarean section. DE LAUSANNE, Annales de Gynæ- cologie, Sept., '86.	{ Rachitic pelvis Porro . . . Recovery . Dead.	
WYDER	Archiv für Gynäkologie, Bd. xxxv, Heft 8.	{ VI-para	{ Flat rachitic pelvis, Cv. 7 centimetres. Hæmorrhage post- partum.	{ Porro . . . Recovery . Living.
WYDER	Archiv für Gynäkologie, Bd. xxxv, Heft 8.	{ I-para	{ Rachitic dwarf pelvis, Cv. $4\frac{1}{2}$ to 5 centi- metres. Hæmor- rhage post-partum.	{ Porro . . . Recovery . Living.
W. S. ROBERTSON	British Medical Journal, November 2d.	{ I-para	{ Dwarf rachitic pelvis, Cv. (?).	{ Porro . . . Dead Living.
J. J. BLACK	Medical News, November 2d	{ I-para	{ Rachitic pelvis, Cv. { Porro . . . Dead Living.	
			3 centimetres. Ft. broids of uterus.	
WILLIAM DUNCAN	Lancet, January 6th	{ I-para	Extreme rachitis Porro . . . Recovery . Living.	

Other cases are reported by Sacré. ⁸¹⁷₈₁₈

TREATMENT OF OCCIPITO-POSTERIOR POSITION.

Out of 400 cases of occipito-posterior positions, collected by Bataillard,⁴⁸ spontaneous rotation forward occurred in 353. In primiparæ, when the child weighed from 5 to 6 pounds, labor was two hours longer than in occipito-anterior position; from 6 to 7½ pounds it was three and one-half hours longer. In multiparæ labor was shorter when the child was relatively large. In failure of rotation the hand was introduced to dislodge the occiput from the sacrum, and, when further rotation was required, Tarnier's forceps was found especially useful. Maternal mortality, 0.5 per cent.; of 660 contrasted cases of occipito-anterior position, 0.46 per cent. Fœtal mortality in occipito-posterior position, 2 per cent.; in anterior position, 0.76 per cent. It was found necessary to apply the forceps at the pelvic inlet in 6 per cent. more cases than in anterior positions.

In the treatment of occipito-posterior positions that refuse to undergo spontaneous rotation forward, Tarnier,³ rejects the procedures of Smellie, Velpeau, Playfair, and Mattei, and recommends a manœuvre not unlike the one described by Loviot.¹⁹⁴ The fœtal head on each side is provided with auricular appendages, which are easily accessible within the pelvic cavity, and which are land-marks in doubtful diagnosis. The ears of the fœtus constitute the *point d'appui* of which Tarnier makes use. When dilatation is complete, slide two fingers of the left hand behind the ear that looks to the right side of the pelvis, secure the fingers firmly against the adherent base of the ear,—not merely against the floating auricle,—wait for a contraction, or, better, push between two contractions; at this moment press strongly behind the ear; at the same time bring your fingers forward with force, but without violence, and continue this movement until your fingers arrive at the left side of the pelvis. Almost always the head will follow your impulsion, obedient to the first solicitation,—sometimes only to the second or third,—and labor will terminate within a few minutes. After anterior rotation is secured it is well to keep the finger in place until the next contraction definitely fixes the head in its new position. In occipito-iliac left posterior positions, use the right hand in place of the left. Upon the use of the forceps in these positions, Tarnier writes: "As far as it is possible it is necessary to make the head execute artificially, by the aid of the forceps,

all the movements that it would execute spontaneously if the labor were normal." But with Depaul, Blot, and Bailly he would make rotation and traction at the same time. He is of the opinion that there is no risk of dangerously twisting the child's neck by this procedure. When the child is dead and extraction difficult, he resorts at once to craniotomy. To this last operation T. Griswold Comstock⁷⁶⁰_{May}, was compelled to resort in 2 cases, seen in consultation, after failure with the forceps.

Budin¹_{Apr. 30} has observed that sometimes "the foetal head, in an occipito-posterior position, will perform rotation so rapidly that the occiput will come under the pubic symphysis while the limbs and body have not yet turned, so that the back of the head faces the anterior portion of the body of the foetus. In one case given, in which version was intended, the hand introduced into the uterus to search for the mouth found it only by following the posterior plane of body. Ribemont made frozen sections of foetuses that had first been put into a state of forced rotation, as above described, and he found that the rotation took place not only in all the cervical columns, but also in the dorsal region down to the seventh dorsal vertebra. On account of this known action it was proposed to employ the forceps in occipito-posterior positions when the head arrived at the perinæum and the rotation was not accomplished. Budin was lately able to make this new application of the forceps with complete success for the mother and child, and thus to give a practical demonstration that there may be a considerable degree of rotation of the foetal head, and that an accoucheur can bring about this movement in certain cases without fear of a dislocation of the cervical column and death of the foetus."

BREECH PRESENTATIONS.

Gaulard²⁸⁶_{Oct} concludes an excellent lecture on the treatment of pelvic presentation with the statement that cephalic version is useless, dangerous, and that, even when successful, it is difficult to maintain the foetus in the new presentation. Budin,¹⁷_{Jan} one of the strongest advocates of cephalic version by abdominal manipulation during pregnancy in breech presentations, records a case in which cephalic version by external manipulation could not be accomplished on account of a relatively short umbilical cord. Torn-gren,²⁸⁶_{Nov. 12, '98} from the study of 261 pelvic presentations, concludes that

complete breech presentations occur when the long axis of the uterus, pelvis, and foetus coincide and the foetal breech is at the inlet; also when the uterus is oblique, the fundus being on the same side with the back of the foetus. Mars⁸¹⁷₈₄₄ recommends for delivery of the breech the following manœuvres, which he has successfully tried in 3 cases during the last twelve years. The cervix being dilated, and the pelvis in the first position, he introduces his right hand, spread out, between the uterine wall and the back of the foetus, while the left hand controls the uterus. The second, third, and fourth fingers of the right hand lie on the back of the child, while the thumb and little finger embrace the body and are supported on the crista ilii. During a pain he presses the pelvis downward until the outlet is reached, when spontaneous delivery occurs. A criticism,⁶¹₇₂ of John Bartlett's essay on "Deveater's Method of the Delivery of the After-Coming Head"¹⁰⁴⁶_{v. 3, p. 438} is to the effect that the procedure is of special value only in case the Smellie-Veit method has failed.

Chassagny²¹¹_{74, 17, 24} describes a modification of his *Défenseur périnéal*. The apparatus consists of an oval disk of moleskin, "infinitely more polished, more slippery than maternal tissue," 13 centimetres (5 inches) long by 10 centimetres (4 inches) wide. Chassagny claims that this apparatus opposes the elongation of the perinæum, that it forces the head to engage in the vulvar orifice like a wedge, causing dilatation in a circular direction, the head slipping over the well-preserved, thick, anterior perineal edge upon the smooth, slippery disk. A spirited discussion, before the *Société Nationale de Médecine* of Lyons, followed the presentation of Chassagny's essay, in which Marduel congratulated the inventor upon his modification, and begged to inquire if the apparatus could not be advantageously modified still further by its complete substitution by the hand.

Under the title, "A New Procedure in Cases of Anticipated Complete Rupture of the Perinæum," Edward B. Weston¹²⁴⁴ proposes the introduction of a deep suture through the perinæum before the passage of the head and the beginning of the rupture. The title of this essay is a contradiction in terms, and the procedure, to say the least, is superfluous, with our present means of perineal protection in ordinary cases and with episiotomy in extraordinary examples.

ANÆSTHETICS.

Hypnotic Suggestion.—Examples of alleged successful hypnotic suggestion in labor are recorded by S. Ramon Cajal (Barcelona),² Fanton (Marseilles),²⁶ and de Grandchamps.¹⁰⁰

Antipyrin.—A noteworthy effect of antipyrin in the mitigation of the pain incident to labor has been observed in 14 cases by Seeligmann,³⁴ in Winckel's *klinik*. In several cases, uterine contractions were completely inhibited. One to 3 injections of a 50-per-cent. solution (0.5 *pro dos.*) by the Pravaz syringe was exhibited, or the drug was administered in an enema (2.0). The effect of the doses lasts from one to two hours. Misrachi,²³⁶ in 56 cases of uterine colic, used antipyrin in doses of from 15 to 30 grains (1 to 2 grammes) with prompt effect. J. Baran⁵⁹ records a case of tardy labor in a primipara in which, he claims, 20 grains (1.3 grammes) of antipyrin *per os* produced the happiest results, both in the alleviation of pain and in the acceleration of labor. Lutaud,²⁴ Talbot Jones,¹⁰⁵ and J. O. Van Winkle,¹ add cases in which it is claimed the pain of labor has been alleviated by the use of the drug. Antipyrin is alleged by Pinzani,⁸ to be without effect otherwise than by the diminution of the force and frequency of uterine contractions.

Strychnine Poisoning.—Avrard,²⁴ records an interesting case of strychnine poisoning during the tardy accouchement of an old primipara. The *sage-femme* exhibited, in the space of eleven hours, 14 milligrammes (21 grains) of sulphate of strychnine. From the observation of this case Avrard concludes: 1. Notwithstanding the well-known action of strychnine on the spinal cord, it acts little, if at all, on the uterine fibre, and should not be regarded as a succedaneum for the ergot of rye. 2. Apart from pain in the lower extremities, it causes convulsive movements, in spite of chloroform, that render operative interference difficult.

ANTISEPTICS.

Charles J. Cullingworth,²² calls attention to "Some Further Applications of Antiseptic Principles to Midwifery Practice." These applications are: 1. The importance of the methods of physical exploration of the abdomen, especially of abdominal palpation, in the diagnosis of presentation and position, and the undesirability of frequent vaginal examination during labor and

especially during the first stage. 2. The importance of complete evacuation of the uterus after labor and after abortion. "If, on examining the placenta and membranes, any portion, however small, be found wanting, the uterus ought, in my opinion, to be at once explored for the missing fragment." 3. To secure drainage from the uterus, it is well not to insist too strictly on the maintenance of the horizontal posture during the puerperium,—a practice instituted by Charles White, of Manchester, 100 years ago, and more recently advocated by Goodell. 4. Stitch up all perineal tears of any size. 5. In the prevention of ophthalmia neonatorum, wipe off the secretions from the eyes at the moment of birth, and later irrigate the eyes with sublimate solution of a strength of 1 to 3000. In suspicious cases use a 2-per-cent. solution of argentic nitrate. 6. Observe antiseptic precaution in the ligation and dressing of the cord; use preferably a dry dressing. Deipser³¹⁷ recommends in every case of labor, soon after delivery of the after-birth, through a period of six days, a daily irrigation of the genital tract, inclusive of the uterine cavity, with 1 litre (1 quart) of hot water at 40° R. (122° F.). As a striking proof of the value of space, ventilation, and cleanliness, Galabin² cites a brief period in English midwifery,—1789 to 1800,—when these means reduced the mortality in the British Lying-in Hospital to 3.2 per thousand.

Döderlein and Günther⁹⁵ assert that by the substitution of mollin (an excessively fatty soap) for vaselin, and by the thorough irrigation of the accessible genital tract with 2-per-cent. solution of creolin, absolute sterilization can be obtained. Under this method of prophylaxis, it is claimed that the normal puerperia at the Leipzig Klinik, during the summer semester of 1888, rose to 70 per cent.; disturbed, 28.1 per cent.; sick, 1.6; no deaths from sepsis. Steffek recommends for the same purpose the insertion of two fingers into the vagina, and the thorough irrigation of the genital tract, inclusive of the vaginal portion, with 1 quart (1 litre) of bichloride-of-mercury solution (1 to 3000) or carbolic-acid solution (3 per cent.); to maintain sterilization, this process must be repeated every two hours.

Poten,⁹⁵ in reply to the exacting demands with reference to absolute sterilization by Döderlein, Günther, and Steffek, brings forward the results obtained at the Hanover *Provinzial-Hebam-*

menlehn und Entbindungs-anstalt under the plan of relative disinfection. Out of 2308 deliveries (1883 to 1888), the proportion of puerperæ free from fever varied from 57.5 per cent. (1885) to 78.8 per cent. (1888),—a result that compares favorably with the 70 per cent. of Döderlein and Günther, obtained under their plan of absolute disinfection.

Mermann³¹⁷_{Apr. 30, May 16} opposes prophylactic vaginal douches as an example of "colossal polypragmasia," and records 200 deliveries without preliminary irrigation, with 79 per cent. of normal puerperia for the first hundred cases and 94 per cent. for the second; 2 deaths,—the one from self-infection, the other probably from cancer of the stomach.

Steffeck³¹⁷_{Nov. 14} calls attention to the inadequate tests of the former writers, and, in reply to Thorn, rightly claims that the vagina, as the field of operation, demands sterilization.

Creolin.—Cameron²⁸²_{June} states that creolin, prepared from coal-tar by distillation, is a thick, syrupy, brownish liquid, with a tarry odor; aromatic, burning taste; soluble in alcohol, chloroform, and ether; and forming an alkaline emulsion with water. It is non-poisonous, a good deodorizer, does not injure the hands or instruments, and is a lubricant in sufficient degree to substitute oil or vaselin. It is also slightly hæmostatic. As a germicide, compared with carbolic acid, according to Attfield, Esmarch (Koch's first assistant), Eisenberg, Kortüm, and others, a 3-per-cent. solution of creolin is equivalent to a 5-per-cent. solution of carbolic acid, and a 2-per-cent. solution of creolin to a 3-per-cent. solution of carbolic acid. As compared with corrosive sublimate, creolin is a much less active germicide, but there is much less danger from poisoning. Creolin is recommended by Fraipont.²⁸⁸_{Feb.} The following objections have been urged against the drug: Severe local reaction (Rotter³⁴_{May 14}); poisoning (Rosenbach³⁴_{May 14}); deodorant effect and obscuring of the field of operation.

Corrosive Sublimate.—We quote from one of the most important contributions³⁰⁹_{v. 12, 13} to the use of sublimate in obstetrics as follows: During the period from May, 1884, to December 31, 1887, 5027 lying-in cases were treated, and almost exclusively by sublimate injections. During the year 1884 the strength of the solution was 1 to 1000, but, on account of the unfavorable experience of Stadtfeld, Sängers, and others, the strength, in 1885-86, was

reduced to 1 to 3000, while in 1887 to 1 to 4000; 19 cases of poisoning, with one termination in death, occurred. Syringing out of the uterus was by far the most dangerous of the modes of employment of sublimate; so that now, for intra-uterine irrigation, the strength of the solution has been reduced to 1 to 5000, or, in atonic post-partum hæmorrhages, 1 to 8000. Garrigues⁵ brings up the number of alleged fatal cases from sublimate intoxication to 22, and urges the use of creolin as an adequate substitute.

Ergot.—Pinzani² Aug. 10 believes that ergot is a prophylactic agent against puerperal fever, but that the involution of the uterus is not accelerated, and may even be retarded. With the latter opinion Blanc⁶¹ May 22 agrees.

PLACENTA PRÆVIA.

Causation.—Development of Placenta in Decidua, Reflexa, and Chorion Larve.—Kaltenbach⁴ Oct. 23 agrees with Hofmeier as to the pathogenesis of placenta prævia. In placenta prævia, decidua reaches to the internal os; above this the reflexa is situated, into which the after-birth is developed. It appears to him that insertion of the placenta over the os internum is explicable only in this manner. The further demonstration can only be accomplished by preparation from early pregnancy. It is necessary to go back to the time when the chorion has not been differentiated into frondosum and larve. When the serotina is insufficient, villi persist in the reflexa. If the serotinal nutrition prove itself inadequate at a later period, new villi grow into the reflexa placenta marginata. The cause of placenta prævia and of this placental formation consists in the antecedent endometritis, which affects the nutrition of the ovum, and the frequent coincidence of placenta marginata with placenta prævia seems altogether natural.

Partial Rotation of the Ovum in Early Pregnancy as a Cause of Placenta Prævia.—Edward Warren Sawyer (Chicago)¹ Oct. 15 suggests partial rotation of the ovum in early pregnancy as a cause of placenta prævia, upon the ground that marginal insertion of the cord is of relatively frequent occurrence in this anomaly. It is admitted that the ovum is not very firmly attached to the decidua in early pregnancy; hence it is not impossible that violence transmitted to the womb might succeed in partially detaching it, causing it to rotate downward on its axis and to lodge in the lower uterine

segment. The detached chorionic villi undergo atrophy, while a new area of the chorion comes into contact with the uterine wall and new villi develop. The placental site would thus be transferred from an upper to a lower zone.

Recurrence of Placenta Prævia.—Ernest Hugh Fitzpatrick,⁶ describes a remarkable case of the recurrence of placenta prævia in five consecutive pregnancies, alleged to have been due to an unusually large uterine cavity. The first three labors were natural and easy, the fourth precipitous, and from the fifth to the ninth (inclusive) the placenta was abnormally situated. Out of these five pregnancies labor occurred in four when the child was viable; of these four viable children only one was saved, and that in the first case of placenta prævia. The mother had profuse post-partum hæmorrhages in two of her first four confinements and in two of the succeeding five, in which the placenta was abnormally situated. All of these examples of placenta prævia were treated under the expectant plan. W. Murray Leslie,² reports the case of a woman treated successfully twice in three years for complete placenta prævia, under the plan advocated by Braxton Hicks,—immediate action, version, and extraction when necessary.

Natural History.—Chaleix¹⁸⁸ records 2 cases of placenta prævia. Case 1, primipara, 21 years old; commencement of pregnancy, early September, 1888. Vertex presentation, O. L. A., caput ponderosum. Slight hæmorrhage before and during labor, which occurred June 17, 1889, and terminated spontaneously after a duration of seven hours. During labor the bleeding took place between contractions. Before complete dilatation of the cervix, spontaneous rupture of the bag of waters at a point 3 centimetres (1 inch) removed from the placental edge. Instant and permanent arrest of hæmorrhage. Child male, weight 3500 grammes (9½ pounds); placenta, weight 750 grammes (24 ounces). In this case, in the words of Pinard, “the loss of water saved the woman from a loss of blood,”—a clinical fact originally pointed out by Pujos. The head doubtless plugged the cervix and aided in the prevention of further hæmorrhage, but the arrest of placental detachment was due, in the first place, to the rupture of the bag of waters. In Case 2, I-para, the bag of waters ruptured spontaneously at the placental edge in the beginning of labor, and the woman did not lose a drop of blood. According to Chaleix, the mechanism of

the arrest of the bleeding in these 2 cases was as follows: The premature rupture of the bag of waters suppressed the cause of hæmorrhage, since it prevented the further retraction of the lower uterine segment over the placenta, and the consequent further separation of the organ. After rupture of the amnion, the change of position occurred between the foetal head and the amnion, instead of between the placenta or the intact ovum and the uterine wall. In other words, the uterine wall and the placenta could be retracted upward over the foetal head. The descent of the head after rupture of the amnion played the rôle—though a subordinate rôle—of an intra-cervical tampon. Coulhon¹⁰⁰ records an example of the spontaneous termination at term of a case of placenta prævia by the complete expulsion of the placenta in advance of the infant. The child presented by the vertex, and was still-born. The loss of blood was trifling, and the mother, a I-para, made an excellent recovery.

Diagnosis of Placenta Prævia by Abdominal Palpation.—Herbert Spencer, of University College Hospital,²⁸² read a paper on this topic before the London Obstetrical Society. After showing the possibility of making out the placental site by abdominal palpation when situated in the corpus and fundus uteri, he described 7 cases of placenta prævia in which he had diagnosticated the presence or absence of the placenta from the anterior wall of the lower uterine segment, the diagnosis being subsequently verified by vaginal and intra-uterine examination. The seven patients were all multiparæ, the vertex presented, and the examination was made without anæsthesia before the rupture of membranes and the onset of pains. In 4 cases it was made out that the placenta was not attached in part; in the remaining 3 its exact site was determined, in 2 cases before it could be felt *per vaginam*. Spencer concludes: 1. In ordinary vertex presentations, the placenta being in the upper segment, the occiput, forehead (at a higher level), and the side of the head can be distinctly felt in the lower segment. 2. In placenta prævia with vertex presenting, the head cannot be felt where the placenta is situated, but may be distinctly felt where the placenta is absent. If the placenta is in front, the examining fingers are kept from the head by an elastic mass, of the consistence of a wetted bath-sponge. If its edge can be felt, it has the shape of the segment of a circle; within the circle everything is obscure

to touch, but outside the head may be plainly felt. Impulses to the head are not clearly felt through the placenta; impulses to the head through the intervening tissues are distinctly felt wherever the placenta is absent. In the discussion that followed, Braxton Hicks and Robert Barnes agreed with the speaker, while Matthew Duncan asserted that diagnosis of the healthy placenta during pregnancy by palpation is impossible.

Prognosis.—A. Kramer⁵⁸⁸₂₁₄ reports a fatal case of entrance of air into the uterine veins following version in placenta prævia.

Treatment.—The discussion of the subject of placenta prævia before the Obstetric Section of the British Medical Association, at Leeds, August, 1889, is specially noteworthy by reason of the eminence of the debaters, and on account of the general soundness of doctrine. Braxton Hicks read a carefully-written essay, in the course of which he proposed the following rules, that are, in the main, in accord with the most responsible opinion and practice of the profession the world over: 1. After diagnosis of placenta prævia is made, proceed as early as possible to terminate pregnancy. 2. When once we have commenced to act, we are to remain by our patient. 3. If the os be fully expanded and placenta marginal, we rupture the membranes and wait to see if the head is soon pushed by the pains into the os. 4. If there be any slowness or hesitation in this respect, then employ forceps or version. 5. If the os be small and placenta more or less over it, the placenta is to be carefully detached from around the os; if no further bleeding occur we may elect to wait an hour or two, but should the os not expand, and if dilating bags are at hand, the os may be dilated. If it appears the forceps can be admitted easily, it may be used; but if not, version by combined external and internal method should be employed, and the os plugged by the leg or breech of the fœtus; after this is done the case may be left to nature, with gentle assistance, as in foot and breech cases. 6. If the os be smaller, and if we have neither forceps nor dilating bags, then combined version should be resorted to, leaving the rest to nature, gently assisted. 7. If, during any of the above manœuvres, sharp bleeding should come, it is best to turn by combined method in order to plug by breech. 8. Where the fœtus occurs before the end of the seventh month, version by combined method, no force following, is the best plan. To these rules I may add: if,

however, we employ a routine method in all cases, it will be found that the version by combined method, no force following, gives a result as good, if not better, than any. The value of Braxton Hicks's plan of version, and the surrender of the further course of the labor to natural powers, except under special indications, is clearly recognized by Lomer,⁴ who brings out the point that the prognosis with reference to the fœtus in placenta prævia in general is unfavorable,—entirely apart from the mode of treatment used,—and that version offers as good, if not better, chances for the child than the other method of treatment. A remarkable difference of opinion as regards treatment is evident. Two lists of cases are appended (page 30), in the first of which the general plan of immediate interference (Braxton Hicks's) has been adopted; in the second, the expectant plan.

Placenta Prævia Lateralis.—Lermuseau²⁰⁸ records 3 cases of placenta prævia. 1885, Case 1, I-para, 24 years old; first hæmorrhage at seventh month. Expectant treatment, notwithstanding several severe hæmorrhages, that reduced the woman to an extreme degree of anæmia until near the end of the eighth month, when an uncommonly severe bleeding was regarded as an indication for the tamponnement, and labor followed, with the delivery by forceps of a living child. Agalactia and severe hysteria from anæmia in the case of the mother and death of the bottle-fed infant some weeks later. 1886, Case 2, second pregnancy in the same patient. Hæmorrhage at seventh month and placenta prævia recognized. Expectant treatment: chloral and colpeurysis until term. Normal, spontaneous birth of a living child that the mother, cured of her hysteria, was able to nurse. Case 3, 37 years old; hæmorrhage at eighth month. Expectant treatment instituted, but soon substituted by *accouchement forcé* on account of the alarming anæmia. Hæmorrhage did not cease, although the placenta was detached around the lower uterine segment until the membranes were ruptured. Version; extraction of an asphyxiated child that was revived. Recovery of the mother. In these 3 cases the insertion of the placenta was not central, but involved the postero-inferior segment of the uterus. Charles E. Williams⁵⁹ reports the following case of placenta prævia centralis: Mrs. Z., 19 years old, I-para, pregnant in the eighth month; profuse hæmorrhage on Sunday, August 4th, continuing, with remissions, until following

Tuesday; at that time, a consultation, when the woman was almost exsanguinated; pulse 120. Tamponade for five hours; rupture of membranes; spontaneous vertex presentation; spontaneous delivery of a dead child two hours later. Maternal pulse now 160. Recovery. Loviot,¹⁹⁴_{July 11} reports the following case of placenta prævia with fatal termination from true anæmia. R., 35 years old, VIII-para, at term; pregnancy normal with the exception of an insignificant hæmorrhage at the fourth month. For three days before delivery, several severe hæmorrhages without pains and in the absence of any apparent cause. Rupture of membranes, podalic version, extraction of dead child. No blood lost during operation, but death from true anæmia forty minutes after the operation.

Hæmorrhage from Premature Detachment of the Normally-Implanted Placenta.—R. T. E. Davies,²_{Oct. 1} reports an interesting case of twin labor, with ante-partum hæmorrhage from the detached placenta of the first child. The points of special interest in the case, as recorded, are: The hæmorrhage before the birth of the children; first child still-born from detached placenta; second child born alive, in spite of the mother's bloodless condition; two separate after-births; immediate delivery of the first child by forceps, of the second by version; recovery of the mother. Unfortunately, no account of the anatomy of the placentæ, nor of the probable cause of the hæmorrhage, nor of the sex of the children, is given. Wilmer Brinton,¹⁰⁴_{Apr. 20} records a case of fatal hæmorrhage in a V-para, due to the premature separation of a normally-implanted placenta, with trauma as the probable determining cause. The woman perished before aid could be rendered, and a dead child was subsequently delivered by podalic version.

Prolapsus Placentæ.—Münchmeyer,⁹⁵_{Mar. 21} reports 2 cases of prolapsus of a normally-implanted placenta in which the placenta was born before the child. A case of prolapse of the placenta is recorded by Wm. H. Lathrop,⁹⁹_{June 12}

Retention of the Placenta.—S. Remy,²³⁶_{Oct.} reports 3 cases of placental retention, and concludes that the difficulty in diagnosis sometimes consists in the small size—it may be in the irregularities of form—of that organ, and that in doubtful cases, especially in the presence of hæmorrhages, it is necessary to prepare for interference. Michon,²⁴_{Mar. 24} recommends Major's procedure; Aldini,⁴⁵⁷₂₂

Alf. Liégard,¹⁰⁰ in case of non-separation of the placenta. This method consists in the injection of water, hot or cold, or of vinegar (Liégard) into the umbilical vein. H. W. Freund⁵⁴ has noticed retention of the placenta seven times in 780 cases, and in all these cases he found great contraction of the internal os,—ring of Bandl. Freund recognizes in pathological antelexions of the uterus a potent cause of placental retention, and urges uncommon care in the management of the third stage of labor in all women known to be the subjects of pathological antelexion,—contraindication to ergot, the employment of the expectant plan of treatment in the management of the stage of after-birth. According to Ahlfeld, the retention of the placenta in delivery at term, or nearly at term, is conditioned either upon a stricture below the placenta—incarceration—or upon adhesion to the uterine wall. The site of the stricture may be anywhere between the contraction-ring and the external os. The cause of the stricture is to be found in an irritation of the contractile portions that existed before the birth of the child, or that is called out after the exit of the foetus. This irritation is due to the use of the forceps, especially in eclampsia; to the forcible dragging of the foetus through the undilated cervix; to the use of vaginal douches before the escape of the placenta; and, above all things, to external manipulation during the stage of the after-birth. Adhesion of the after-birth is of relatively frequent occurrence in placenta prævia, in consequence of the in-wandering of excitors of inflammation out of the cervix under the low-seated placenta. In the same manner, migratory cell-elements (syphilis) may be the cause. The presence of the condition in a former pregnancy and the changes in the placental tissue, due to the kidney of pregnancy, also must be mentioned. Ahlfeld regards “Freund’s pathological antelexion of the puerperal uterus as a normal condition.”

Adherent Placenta.—Berry Hart,³⁶ from the macroscopical and the microscopical examination of an inverted uterus with adherent placenta, concludes “that the cause of non-separation here depended, apparently, on the defective development or pathological condition of the mesh-work or spongy layer where the normal plane of separation for the placenta lies.” But, as remarked in an excellent editorial on the subject,¹¹² it is difficult to comprehend how this alleged morbid condition could have interfered with

placental separation, seeing that the normal plane of separation lies not in the glandular layer, but in the cellular layer above.

Retained Membranes.—Eberhardt (Halle), as stated by Cameron,²⁸² refers to the diversity of opinion among authorities as to the moment of retained membranes. Ahlfeld and Lazarewitsch say they are the potent cause of self-infection; Olshausen, Credé, and Kaltenbach assert that the danger does not consist in the retention *per se*, but in the infection of such membranes. In Halle the treatment of the third stage is expectant. If the placenta does not come away in 1½ to 2 hours Credé's method is employed. The essential points of Kaltenbach's treatment are (1) removal of only those portions of the membranes that protrude into the vagina; (2) keeping the vagina aseptic during the puerperium by repeated irrigations; (3) administering ergotine to hasten the separation of the adherent membrane.

Rechlen⁹⁵ reports 152 cases of retained membranes. In 104 expectant treatment was practiced; in 48 the membranes were manually removed. The mortality and morbidity were far greater in the cases of manual interference than in those that were treated under the expectant plan. A. A. Henske⁵¹⁴ has observed 29 cases of retention of portions of the membranes since January, 1888; in 15 the membranes were at once removed by the hands, and in 14 no interference was attempted. The result was that 1 death and fever occurred among 7 of the former class, while the latter class escaped all febrile disturbance. Martini,¹⁸² as the most frequent causes of retention of the peripheral portions of the ovum, states: 1. Hæmorrhages from the uterus before complete separation of the membranes. 2. Early expulsion of the placenta. 3. Intra-uterine death of the foetus. 4. Abnormal adherence of the placenta. He expressed himself in favor of the expectant plan of treatment of the stage of the after-birth (at the Munich Klinik, two hours), although in cases of retention of the foetal envelope 57.5 per cent. had fever.

INVERSION OF THE UTERUS.

Vincent²¹¹ reports a case of inversion of the uterus in an old primipara, probably due to traction of the cord, reduced by taxis.

Examples of complete inversion of the uterus immediately upon the termination of the second stage of labor, and reduction by taxis, with recovery, are recorded by Arthur Jefferson,⁶ and

N. Guhman.¹⁰⁰ Walter Hutchinson,⁶ reports a case of spontaneous inversion of the uterus in a primipara, probably due to a short cord (9 inches—23 centimetres), that resembles closely Jefferson's case.⁶ The reduction was effected by taxis. Gustav Braun⁸ has observed twice in the same woman spontaneous inversion of the uterus after delivery of the placenta. George E. Fell⁵⁰ relates the history of a case of partial inversion of the post-partum uterus, in which hot-water irrigation and taxis effected reduction.

W. Huber³¹⁷ reports a case of recurrence of total inversion of the uterus with prolapsus, following version for transverse presentation, which terminated fatally from purulent peritonitis and metritis. A case of total inversion of the uterus following the third stage, with severe acute anæmia, is reported by A. Bergstrand⁵⁷⁰ as having been successfully reduced under hypnotic suggestion, and recovery secured by the intra-venous injection of the physiological salt solution. In a paper entitled, "Inversion of the Uterus After Posthumous Delivery," Isaac E. Taylor⁴⁰ asserted the fact of occurrence, and explained the mechanism by a continuous persistent contraction of the uterus that unfolded the cervix from below upward.

RUPTURE OF UTERUS.

Leopold's contribution⁹⁶ to the discussion of the treatment of rupture of the uterus is significant. After an able criticism of the plans proposed by Veit, Piskaček, Winckel, Kaltenbach, Hofmeier, and others, he draws the following conclusions:—

1. Rupture of the uterus occurs forward—that is, in the *plica vesico-uterina*—more frequently than heretofore has been believed. The bladder may tear completely off in a transverse direction without other injury. Under these conditions hæmorrhage may be considerable. In such cases the tear can be most securely closed and union best secured by forced antelexion of the uterus, compression bandage of gauze (applied directly to the uterus within the peritoneal cavity), and iodoform-gauze tamponade at the site of tear; that is, of the uterus and the vagina. 2. The longer the period between the occurrence of the rupture and the treatment, and the greater the attempts at delivery, the more unfavorable is the maternal prognosis. Infection and hæmorrhages rapidly exhaust the parturient. 3. Recent ruptures of the uterus, even in cases of the highest degree, present favorable prospects for cure.

4. The child generally dies quickly after the rupture. The pulse of the mother and her general condition may exhibit within a very short time (one hour) a very serious weakness. But by prompt assistance—that implies energetic and successful arrest of hæmorrhage—the afflicted woman can be saved. 5. The child must be delivered in the manner that most spares the mother, otherwise the rupture may be increased with fatal effect. Operations that diminish the volume of the child, therefore, are indicated in the fore-going or after-coming head; even when pelvic contraction is slight, perforation; in transverse presentation, embryotomy rather than version. 6. When the presenting part (head, breech, foot) has entered the pelvis, and the rest of the body is in the abdominal cavity, complete labor through the natural passages. 7. When the child is entirely born into the abdominal cavity, laparotomy, under strictest antiseptic precaution, should be performed. The general practitioner ought to send the case to the nearest clinic, when possible; under other conditions let him secure skilled and reliable assistance. 8. Before and after delivery *per vias naturales*, the vagina and uterus (the site of tear) should be irrigated with a 2-per-cent. solution of carbolic acid. The edges of the tear should be approximated from within (traction with tenacula or bullet forceps) and from without (compressive bandage of gauze). Place within the inner genitalia, from the fundus uteri down to the vagina, especially right under the rupture, a long and thick rope of strips of iodoform-gauze, which, according to the course of the puerperium, is to be removed about the eighth to tenth day. 9. When the child is delivered by abdominal section cleanse thoroughly the abdominal cavity, arrest hæmorrhage, and especially try to suture the rent; place a rope of iodoform gauze in the uterus and vagina, and compress the site of the tear, after firm approximation of the edges. by a second rope, whose end is conducted out of the lower angle of the abdominal wound. 10. The subsequent treatment should be conducted in accord with the well-known rules. Precepts in detail cannot be given. Each case must be judged and treated on its own peculiar features.

Piskaček⁵ recommends, in case of incomplete rupture, the tamponade with iodoform gauze; for complete rupture, drainage by iodoform wicking. He claims that the results under this treatment are better by 12 per cent. than by laparotomy. He reports 7 cases,

of rupture of the uterus from Breisky's clinic, 4 of which recovered, while 3 died. Of the 5 cases treated by drainage with iodoform wicking 4 recovered. Piskaček's paper was discussed at length before the Vienna Obstetric-Gynæcological Society. The verdict of Fleischmann, Felsenreich, v. Erlach, Breus, Peters, and v. Bandl,^{84 Feb.} was in favor of laparotomy in event of perforation and escape of all or portions of the ovum into the abdominal cavity. Lihotzky^{87 Mar. 15} adds to the list 2 cases of rupture of the uterus treated by drainage with iodoform wicking. One case terminated in recovery, the other in death. Veit, Schroeder, and Ingerslev also recommend drainage.

Charles A. L. Reed^{1 Nov. 3} reports 2 cases of rupture of the parturient uterus in which he performed laparotomy. His conclusions upon the treatment of the condition are as follow:—

1. In cases of rupture of the uterus, with the head presenting, delivery by forceps should be attempted, but should be abandoned if not found easily practicable. Turning should not be undertaken, but the case should be at once recognized as one for either the Cæsarean or Porro operation.
2. In cases of ascertained incomplete rupture, treatment should be by antiseptic irrigation and rest.
3. All cases of ascertained complete rupture should be submitted to abdominal section, as soon as the condition of the patient with reference to shock will admit, for the following purposes, viz., (1) to explore the abdomen; (2) to remove all foreign bodies; (3) to cleanse the peritoneum; (4) to close the rent if the labor has been short and the uterus not seriously damaged, and (5) to remove the uterus if the labor has been long and the uterus seriously damaged.

Stanislaus Braun^{8 May 10} records a case of spontaneous rupture of the uterus during pregnancy, and extraction of the foetus by laparotomy six weeks later. The mother died. In Gustav Braun's case of spontaneous rupture of the uterus during labor,^{84 Mar. 16} in which the dead foetus was extracted by laparotomy, the mother also perished. Examples of rupture of the uterus during labor, due to various causes, have been recorded as follows: Karl A. Herzfeld,^{84 Aug. 17} hydrocephalus; Couder,^{7 Feb. 10} face presentation; Bousquet,^{46 Jan.} cancer of the cervix.

Deutsch^{317 Apr. 5} describes the course of labor in a patient upon whom, four years before, laparotomy had been performed on account of traumatic rupture of the uterus. Uterine inertia characterized

the first stage, so that version and extraction were done: profuse post-partum hæmorrhage from atony of the uterus, and from the adhesion of the placenta to the old cicatrix in the anterior uterine wall. Recovery. Oscar Schaeffer⁸⁴_{Oct. 15, '92} records a case of rupture of the uterus, with the escape of the fœtus into the abdominal cavity, that terminated in death after laparotomy.

Examples of rupture of the uterus during labor, with termination in recovery after laparotomy, are recorded by Piltz.⁴¹_{Dec. 24, '90} Rupture of the uterus treated by laparotomy with recovery, T. Tradon.¹⁰¹⁷_{p. 306} A successful case of Porro's operation for rupture of the uterus is recorded by Henry C. Coe.¹_{Nov. 16} Examples of rupture of the uterus during labor, with fatal termination under the expectant treatment, are recorded by T. L. McDermott,²²⁴_{Jan. 5} A. A. Matheson,³⁶_{Feb.} Finger,⁴_{Dec. 17, '90} H. C. Owen,²⁰²_{Dec. 30, '90} William T. Lusk,¹_{Sept. 1} Winckel.¹⁴⁷_{May} A. Withers Green²_{Sept. 14} reports a case of rupture of the uterus in a III-para at the seventh month. Treatment, absolutely expectant, was followed by a complete though slow recovery. Herzfeld⁸¹⁷_{Dec. 20} records a case of rupture of the uterus, due to hydrocephalus: craniotomy, drainage by gauze; death from suppurative peritonitis.

COMPLICATIONS.

Tumors.—With reference to complication of pregnancy and labor by tumors of the pelvic organs, Fehling⁶⁰_{Dec. 4, '90} asserts that the guiding principle in treatment should be the preservation of the life and health of the mother, and only when this end is despaired of should the life of the fœtus be considered. Phillips¹⁵_{Dec. 1, '90} has collected 264 cases of fibro-myomata complicating labor, to which he adds 18. The available methods of treatment are: Induction of labor, reposition of the tumor, myomotomy, Müller's ablation; but each case must be treated under its own peculiar indications. Goodell¹⁹⁶_{July} describes a case of dystocia due to a fibroid, nearly the size of the child, that filled out the pelvis and pushed the cervix upward. It was decided to perform Cæsarean section before the class, but on the evening previous to the operation labor set in, and the child's head pushed the tumor to the side and upward, so that after several hours a healthy child was born. Turgard⁴⁸_{Dec. 1, '90} encountered a case of labor in a VI-para, complicated by a mobile fibroid, in which he was able to push up the tumor and then draw down the head by the forceps.

Felsenreich⁸_{Oct. 1, 10} has encountered 6 cases of pregnancy complicated by uterine fibro-myomata. He concludes that when a polypoid muscular tumor is seated on the lips of the uterine os it should be removed as soon as recognized. The operation need not interrupt gestation. It should also be removed at once when the tumor is discovered during or after labor (Sydney Turner, Depaul). Polypoid myomata attached to the corpus uteri should be removed immediately upon the evacuation of the uterus when the woman's general condition does not positively contra-indicate operative interference. Subserous, sessile myomata of the corpus and fundus uteri often render the diagnosis of pregnancy difficult. When serious symptoms arise, the treatment consists either in the induction of premature labor or in laparotomy, with removal of the tumor. In these cases considerable diminution in the size of the tumor was observed during the period of involution, that was probably assisted by the exhibition of ergot. Laparotomy is indicated when examination under anæsthesia shows the uterus and tumor to be movable, and when it is apparent that a sufficient pedicle can be formed. In immobile myomata of the collum uteri, the choice lies between the induction of abortion and the performance of Cæsarean section at term. Under such conditions Felsenreich declares himself in favor of the induction of abortion.

An instructive case of dystocia, conditioned upon an exudate into the parametrium and into the pelvic peritoneum, that indicated craniotomy, is recorded by Felsenreich.⁸⁴_{Jan.} The beneficial effect of massage and of the changes incident to the evolution and involution of the pelvic genitalia was particularly apparent. Felsenreich is of the opinion that when two-thirds of the pelvic cavity are unoccupied by the exudate tumor, and therefore available during labor, treatment should be expectant, just as in pelvis blocked up by immobile myomata (P. Müller). When one-half of the pelvic cavity is filled up, the indication for the induction of abortion is clear when the mother declines Cæsarean section.

Gelstrom³¹⁷_{Nov. 44} has encountered a case of prolapse of a dermoid cyst through the rectum during labor. The tumor was removed *per vaginam*, and the woman recovered. Tuxen³⁷³_{Nov. 24} records a case of myoma of the uterus requiring version and extraction. Child born alive. Three weeks later, a pedunculated fibro-myomata—size of a foetal head—presented itself at the vulvar orifice, and was cut off.

Transverse Presentations.—G. Eustache ²⁸²_{Oct. 28} (Lille) reports a remarkable case in which shoulder presentation occurred thirteen times. Gery reports one case in which the shoulder presented in 9 successive pregnancies; Walter, 5; L'Echryse, 3; Danyan, one of 5, one of 9; Joulin, 4; Naegelé, 5; Meissner, 11. Of all cases on record, Eustache's is the most remarkable. Patient married at the age of 19 years; bore her first child in 1870, presentation vertex. The perinæum was torn through into the anus, and the vaginal portion of the cervix lacerated to the vaginal junction; both healed badly. Eustache attributes the recurrence of the mal-presentation in his case to the relaxation of the uterine walls and to fibro-muscular structure at the pelvic inlet, caused by the enormous cervical laceration of the first confinement.

Brow Presentations.—M. E. Bonnaire ¹⁰⁰_{Mar. 20} discusses at length the subject of brow presentations. It does not appear from his argument, however, that there is sufficient reason to depart from the German custom of viewing so-called brow presentations as examples of unusual mechanisms of either vertex or of face presentations.

In an account of the natural rectification of mal-presentation and its imitation by art, King ²⁷_{June} discusses at length the alleged influence of thigh-pressure—pressure of the flexed thighs upon the antero-lateral region of the abdomen, produced by certain postures (notably squatting)—as a factor in the natural rectification of transverse or oblique presentation, and other malpositions of the child. King's propositions are sometimes contradictory. He asserts ²⁷_{Nov. 20} that before labor the normal position of the child is a dorso-anterior position of an oblique presentation,—the presentation that, in the present essay, he considers pathological. Then, his views on the etiology of transverse presentation differ *in toto* from the notions finally demonstrated and generally accepted. Finally, his study partakes of the nature of a work of supererogation, seeing that, by rectification in the lateral posture and by Wigand's method of version, all cases of transverse presentation, seen before labor or early in the first stage, can be easily corrected when these changes do not occur spontaneously.

Hysterocele.—Adams ²⁷_{Nov.} reports a case of hysterocele gravidarum.

Prolapsus Uteri.—Zinsmeister ⁸⁴_{Nov. 2} records a case of labor, with

prolapsus of the cervix and condylomata on the left nymphæ, that required incision of the os externum and craniotomy. V. Erlach has observed numerous cases of *elongatio et prolapsus cervicis*, associated with great œdema, but such cases commonly terminated spontaneously. Budin¹²²_{July} reports a case of labor, complicated by prolapsus uteri, in which spontaneous delivery with retraction of the cervix within the vulva occurred.

Laceration of Vagina.—J. Matthews Duncan⁶_{July 12} calls attention to certain cases of vaginal abscess, in women recently confined, that he ascribes to laceration of the submucous connective tissue and consequent hæmatoma. The verdict of the London Obstetrical Society, however, is that these cases are examples of infection following laceration of the vagina.

Occlusion of Cervix.—Santiago Veve (Puerto-Rico)⁴⁵⁹_{Sept.} reports a case of abdominal hysterotomy on account of obliteration of the cervix, with death of the mother, at the end of thirty-six hours, from septicæmia. A. F. Hodnett⁶⁴⁷_{Nov.} reports a case of conglutination of the os externum in a parturient. A small indentation in the otherwise smooth and globular surface of the lower uterine segment was found. During a pain the index finger was applied to this indentation, and firmly pressed against the presenting vertex; the adhesion gave way and the finger entered the uterine cavity. Spontaneous delivery of a living child rapidly followed. The following cases of dystocia, due to maternal causes, have been recorded: A. W. Strickland,²⁷²_{Feb. 22} atresia of the os uteri in a Hot-tentot primipara, incision, recovery; Misrachi,²³⁶_{Feb.} acute elongation, with prolapsus of the neck of the uterus, forceps, recovery; Geyl²³⁶_{Apr.} records a somewhat similar case; W. F. Lippitt, Jr.,⁵⁹_{Jan. 11} delivery of the placenta, after separation and expulsion into the vagina prevented by vaginismus; Thierry,²⁰⁸_{July 1} dystocia, conditioned upon complete obliteration of the vaginal portion, due to trauma of antecedent labor, requiring incision and terminating spontaneously.

Rigid Hymen.—Charboux²⁰⁸_{Aug. 1} has observed an example of dystocia, caused by persistence of the hymen, that required operative interference during labor. Thierry remarked that the hymen is the inferior termination of the vagina. The resistance opposed by this membrane is explained by the anatomical researches of Budin and de Sinéty, who have demonstrated that sometimes a

thick stratum of connective tissue is situated between the vaginal and vulvar aspects of this membrane.

Hæmatoma of the Vulva Causing Retention of the Placenta.

—Chazan⁵ found a hæmatoma, as large as a child's head, in the right labium, three hours after labor, that caused retention of the placenta. Upon removing the placenta the tumor burst, but the consequent bleeding was easily checked by tampon. Resorption nearly complete at the end of fourteen days.

Relaxation and Rupture of the Pelvic Joints.—Remy²⁸⁶ records an example each of relaxation of the left sacro-iliac joint and of rupture of the pubic symphysis during labor. Both cases terminated in recovery under appropriate immobilization of the joints. The softening of the articular tissues during gestation and the large size of the child were held responsible for the accident in the first place, while in the second three antecedent circumstances were probably the cause; excessive development of the child (4680 grammes—13 pounds), defective development of the maternal skeleton, and traction with Stoltz's forceps. Dührssen⁸¹⁷ reports a case of rupture of the symphysis pubis during labor, caused by the shoulder of an uncommonly large female child. Recovery after suppuration in the joint. Martin⁸¹⁷ has encountered 2 cases: 1. Rupture of the symphysis and sacro-iliac joints, due to the passage of the shoulders through a moderately-contracted pelvis; death from diphtheritic endometritis; suppuration in the joints. 2. Rupture of the symphysis during forceps delivery; suppuration and spontaneous evacuation of pus; tedious recovery. Olshausen and Gusserow point out that unusual mobility of the joints may lead to error in diagnosis, and that sometimes this unusual mobility may predispose to rupture.

Prolonged Gestation.—Giovanni Cosentino¹³ records 3 cases of alleged protracted gestation that caused difficult labor on account of the size of the children. From date of commencement of last menstruation the durations of pregnancy were, respectively, 311, 306, and 287 days; the weight of the foetuses, respectively, 4000, 5560 and 4500 grammes (10, 15, 12 pounds).

Missed Labor.—An important contribution to the natural history of retention of the foetus and annexes *in utero* is furnished by a communication from W. A. Ellisen and T. C. Smith,¹²⁰ entitled, "Two Years' Detention of a Dead Foetus in Utero:

Delivery per Vias Naturales Prevented by an Elongated, Tortuous, Small, Tough, Indurated Cervical Canal." A case of "missed labor," attributed to changes in the uterine musculature, is recorded by Goth.⁹⁵

Kyphotic Pelvis.—Treub⁵ reviews the theories of Freund and Breisky on the kyphotic pelvis, and adds conclusions from his own studies. Freund's theory that this pelvis is an example of the persistence of the infantile pelvis, is denied. Treub thinks the kyphotic pelvis results from early spinal kyphosis that has prevented development in the normal direction. He indorses Breisky's teachings as to muscular action and its influence on the pelvis.

Obliquely-Contracted Pelvis Following Scleroderma.—Torgler³¹⁷ reports a case of forceps delivery under the indication of an obliquely-contracted pelvis. The patient, 18 years old, had, five years before, scleroderma of the right lower extremity, and in consequence atrophy and non-development of the pelvis of the same side. The diagonal diameter was lessened by more than 1 centimetre (0.39 inch), while the left hip was higher than the right.

Heart Disease.—D. Berry Hart³⁶ has encountered 3 additional cases of mitral stenosis fatal in the third stage of labor.³⁸ He is of the opinion that the prognosis in such cases "depends on two things: the extent to which dilatation has advanced and the endocarditis set up. When the failure in compensation has extended to the right side of the heart, weakening it, then the sudden strain from the excess of blood entering when the third stage is completed may prove fatal."

Rupture of Bile-duct.—P. C. Williams⁹ reports a case of rupture at the junction of the common bile-duct with the hepatic duct during labor, with consequent general peritonitis and death. The case simulated closely rupture of the uterus. It occurred in the wards of Carl Braun at Vienna.

Fœtal Dystocia.—Cases of dystocia, due to the following causes, have been reported: H. Laird Pearson,² obstructed labor from growths on fœtal face and pelvic contraction, said by John Phillips² to be unique; H. A. Cooper,¹⁰² occipito-posterior, with very large child (16½ pounds), forceps; Hubert Peters,⁶¹ fœtal ascites, perforation; T. J. Hudson,⁶ fœtal cranial tumor, occupying vertex, forceps.

Fœtal Malformations.—C. E. Underhill³⁶ reports 6 cases of

labor complicated by foetal hydrocephalus, and points out the importance of the history of the case in the diagnosis of hydrocephalus. He advises immediate puncture of the presenting head, or craniotomy, and is opposed to version, with perforation of the after-coming head. E. Vincent,²¹¹_{supra} in a case of dystocia from hydrocephalus, performed the operation of Huevel and Tarnier. After podalic version the lamina of the spinal vertebra were opened, the meninges pierced by a large trocar, and 3 litres (3 quarts) of cerebro-spinal fluid discharged. After delivery, the head, distended with water, showed a circumference of 55 centimetres (22 inches). L. S. de Forest¹⁸⁸_{supra} encountered a case of spina bifida, with spinal meningocele, in which the birth of the trunk was apparently delayed by the tumor. Strzalko and Eliasberg³¹⁷_{Re. 34} report the case of a monstrosity, presenting by the liver and intestines; delivery by traction on an area; retention of trunk after birth of head, due to ascites; fluid evacuated by puncture through the neck, thorax, and diaphragm.

Machell⁸⁹_{supra} reported to the Toronto Medical Society, January 15th, a case of dystocia in a I-para, eight months advanced in twin pregnancy. First foetus presented by the face, but delivery was prevented by the engagement of the vertex of the second. Finally, delivery of the still-born first child was effected by pressing up, between pains, the vertex of the second. Langstaff, of Richmond Hills, described a similar case ten years ago.

A. Freund¹⁸²_{supra} diagnosticated twin pregnancy in a strong I-para, from whom the liquor amnii had flowed away on the previous day. The occiput of quite a large head protruded from the genitals, but its further progress was prevented by a second head. After removal of the first head the second was delivered by the forceps, when a dicephalus was revealed. The anterior duplicity extended to the seventh cervical vertebra.

MULTIPLE PREGNANCY.

Eisenhart³¹⁷_{Re. 36} reports 2 cases of triplets at Munich. The first case was that of a multipara, with history of twin pregnancies in family; nephritis present; labor, twenty-six and a half hours; children, female,—two born in vertex presentation, one in breech. One child survived. Two placentæ, double amnion, one chorion. The second case was like the first, except that abortion occurred

at the fifth month. In Munich, triplets have been observed once in 5218 cases. In a case observed by M. H. Vogt,³ labor was complicated by eclampsia, but the mother and three infants—two girls, one boy—survived. A like case is reported by Labusquière.¹⁴ L. Sperling,⁹⁵ reports 2 cases of triplet pregnancy, in both of which nephritis was present; in the first cases, three infants, female, one chorion, three amnions; in the second, two females, one male, three chorions. In J. A. Wetherell's case,⁶ the three infants were males; two placentæ with two chorions; no nephritis. R. Rudolph Ball,⁵⁰ records a case of twin delivery in which an interval of eight days elapsed between the births of the infants. D. Thomas,² reports a case of quadruplet pregnancy in a woman afflicted with mitral insufficiency. Labor at term; all the children dead by the tenth day; mother succumbed, six hours after the last birth, from heart failure. It is alleged that the kidneys were normal. F. G. Stephens,⁷⁰⁰ reports a case of triplets with favorable termination to mother and children. Nephritis absent.

STATISTICS.

Ehler's⁵ extensive tables of the death-rate and morbidity of parturients in Berlin and the German Empire show a general average mortality from sepsis of less than 1 per cent. and a general average morbidity of $3\frac{1}{2}$ per cent.

Schauta's report⁸ of the Obstetrical and Gynæcological Clinic at Innsbruck, from January 1, 1884, to March 31, 1887, contains the records of 2183 labors. The morbidity of the clinic, 11.59 per cent.; carbolic-acid treatment (1883), 20.1 per cent. (768 labors); corrosive sublimate, 6.9 per cent. (1415 labors). The mortality, 20, or 0.92 per cent. Cause of death, puerperal in 13, or 1.69 per cent.; carbolic-acid treatment, 1, or 0.07 per cent.; corrosive sublimate, non-puerperal, 6, or 0.28 per cent.

The Sixteenth Annual report of the Maternity Hospital of Philadelphia contains the records of confinements and of deaths since the opening of the hospital in 1873 to September 30, 1889. Total number of women confined, 1368; number of deaths from all causes, 20; from septic infection, 11, or 0.80 per centum; 2 deaths, not included in the 11 from sepsis, are ascribed to "Traumatic Peritonitis after Embryotomy." Traumatic peritonitis after embryotomy is an example of septic infection, and ought to be so

classified. Joseph Price⁶¹ reports "500 deliveries without death in the Preston Retreat" (Philadelphia). "The 500 cases reported date from the last death occurring in the Retreat, more than five years ago, and include 275 confinements under Goodell's care before his resignation as physician in charge. The series had extended to nearly 600 cases before the first death occurred, during my service as physician in charge. Between these deaths there has not been a case of puerperal septicæmia in the institution, both of these deaths being from puerperal eclampsia in patients suffering from chronic Bright's disease."

Pinard (Davis)⁵ reports his results at the Maternity of Laraboisière in 12,580 labors, the total mortality being $\frac{74}{1000}$ of 1 per cent., mortality from septic infection $\frac{39}{1000}$ of 1 per cent.; antiseptics employed, 1 to 4000 solution of biniodide of mercury and a saturated aqueous solution of naphthol. To receive the lochia, oakum dipped in a solution of bichloride of mercury. The cord is dressed with dry cotton, sterilized with mercury. Lemon-juice has been substituted for argentic nitrate in the prophylaxis of ophthalmia.

Fraipont,⁹ describes the method of antisepsis adopted at the Obstetrical Clinic of Liège as being based on the researches of Döderlein, and as resembling the plan employed at the Leipzig Klinik. In Liège every woman is given, on admission, a general bath, and minute precautions are taken to insure cleanliness. During labor the vagina is irrigated each time that an examination is made by means of a 3-per-cent. solution of creolin, which is injected through a glass tube introduced, together with the index finger, which is made to reach as far back as the cervix. The labia are then occluded, so that the fluid may distend the vagina and obliterate all the rugæ, and reach even into the interior of the os, detaching and washing away the mucus accumulated there. From 1 to 2 quarts (1 to 2 litres) of the solution are used for each irrigation. Immediately after the placenta is detached another irrigation is administered, which is repeated regularly during the first few days of the puerperal period. "Molline" is employed as a lubricant.

Kufferath, from the Maternité de Bruxelles, 1887,²⁵⁶ reports of 418 women, 31 febrile, morbidity 7.4 per cent.; Maternité de Liège, 1888, morbidity 9 per cent.

FUNIS.

Prolapse.—H. S. Haid¹⁸⁶_{Mar.} reports 2 cases of prolapse of the cord, occurring in multiparæ, in which the reduction in the knee-chest posture proved permanent.

Short Cord.—J. D. Rouse¹⁵¹_{May 16} reports a case of labor in which the placenta and child were simultaneously expelled. The cord, 3 inches (7.6 centimetres) in diameter and $1\frac{3}{4}$ inches (4.4 centimetres) in length, contained the liver and some intestine. The child lived fifteen minutes. X. O. Werder²⁷_{Feb.} has observed a case of rupture of a short cord, with laceration of the abdominal walls of the fœtus, during labor. In this case the cord was less than 4 inches (10 centimetres) in length and about 1 inch (2.5 centimetres) in diameter. The fœtus was the subject of marked spina bifida. Voiturier²²⁰_{Aug. 29} records a case of ovular abortion, due, as the author claims, to death of the fœtus from spontaneous rupture of the cord. Examples of dystocia due to fœtal causes are recorded by J. Davidson.⁹_{Jan. 12} Short cord (total length 12 to 14 inches—0.3 to 0.36 metre), division. Successful delivery of living child.

Knots.—M. Cameron²¹³_{Jan.} showed a cord so tightly knotted as to cause the death of the fœtus.

Coiling of the Cord.—F. Merkel⁸¹⁷_{Apr. 22} records a case of coiling of the umbilical cord around the left forearm $3\frac{1}{2}$ centimetres (1.38 inches) above the wrist-joint. The skin showed a deep groove down to the bone; below the coil the extremity was œdematous and swollen.

Amniotic Umbilicus.—Widerhofer²³_{July 17} gives the name of “amniotic umbilicus” to a rare anomaly in which the amniotic sheath of the umbilical cord, instead of becoming continuous with the skin of the abdominal parietes at the ring, spreads out and replaces the skin over a zone of variable extent surrounding the insertion of the cord. He records one observation. The infant, 1 day old, had been thought by the midwife to be suffering from an umbilical hernia. The sheath replaced the skin over an area some 2 inches (5 centimetres) in diameter, and in appearance resembled a placenta in miniature, seen from the fœtal side. During the usual retrogressive changes in the stump of the cord the amniotic disk participated in the same changes, the whole coming away together by the tenth day. There remained a granulating surface on the site of implantation of the amnion, which healed in

about six weeks, leaving a stellate cicatrix the size of a six-penny piece.

Treatment of the Stump of the Umbilical Cord.—Cholmogoroff, of Moscow, ³⁸⁸ ²⁸² _{R.16, R.1; Oct} concludes an elaborate investigation of the relation between micro-organisms and the stump of the umbilical cord, as follows: 1. The navel-cord of the newborn child is absolutely free from bacteria; if subsequently present, they must have been introduced from without. 2. In the stump, the organisms that are found are: Non-pathogenic—*sarcina lutea* and *bacillus subtilis*; pathogenic—*staphylococcus albus*, *aureus*, and *citreus*, and *streptococcus pyogenes*. 3. The stump undergoes mummification or mortification, according to the surroundings. 4. An increased development of both the pathological and non-pathological bacteria is favored by fetid mortification. 5. During dry mummification the greater portion of the cord (the hard, dry, external portion) develops only non-pathological organisms, while a very small segment (next to the navel) develops a few pathological as well as the non-pathological organisms. 6. Under the plaster dressing, mummification takes place more completely than under other dressings, and fewer pathological bacteria are observed. 7. The pathological bacteria of the navel-cord are identical with those of puerperal fever. 8. The appearance of pathological bacteria in the navel-cord is independent of puerperal fever in the mother and ophthalmia in the child. Baginsky ⁹ _{Apr. 30} declares himself against moist antiseptic dressing of the cord and in favor of dry cotton with a little iodoform. Carbolic acid is most dangerous, for only a slight abrasion of the navel is necessary to cause toxic symptoms, and the toxæmia is commonly fatal.

Mummification of the Umbilical Cord.—Casper's deductions as to the value of mummification of the umbilical cord as a means of determining live births are shown to be too general by an interesting case of this condition recorded by Frederick W. Lowndes. ¹⁸⁷ _{July} "At the end of 1885, the body of a fully-developed, newly-born male child was found in a cellar, with a scarf tied tightly round the neck. The lungs gave evidence that the child had respired. The umbilical cord, for about $\frac{1}{2}$ inch (1.3 centimetres) from the navel, was perfectly fresh; then came the usual line of demarcation; the remainder of the cord, about $2\frac{1}{2}$ inches (6 centimetres), was completely mummified, and there were no appearances of any ligature.

Lowndes is of the opinion that the state of the cord showed indisputably that the child had survived its birth for at least twenty-four hours, since the change which had taken place was a vital one, and not the result of mere post-mortem desiccation."

Omphalorrhagia Neonatorum Spontaneæ. — Cases of fatal hæmorrhage from the stump of the umbilical cord are recorded by Tross, of Karlsruhe (1),²_{Sept. 28} Llewellyn Eliot, of Washington, D. C. (4).²⁷_{Oct.}

ASPHYXIA OF THE NEWBORN.

Alexander Duke²²_{Oct. 30} gives the following simple method to relieve asphyxia of the newborn: "Should I find the funis pulsating strongly, I wait until this has almost ceased and then divide it. I then raise the limp and flaccid body of the infant, and, turning it face downward, with arms and legs pendant, allow the thorax to rest across the open palm of my left hand, and at intervals of five seconds (which I measure carefully by counting slowly) compress the ribs with my hand, as one would work a rubber syringe. While my left hand is thus fully occupied, the position of the head allowing the tongue to fall forward and facilitate the escape of mucus from the mouth, I cleanse the lips of the infant with a napkin held in my right, and insert my index-finger well into the pharynx, so as to establish the 'atmospheric highway.' I then proceed to change the child to my right hand, so that the tips of my fingers, resting near the heart, will at once detect any improvement in its action."

Egon Braun⁹⁹_{Jan. 2} has devised an apparatus for the resuscitation of asphyxiated infants. As described by Doe, it consists of a wooden box with a slanting top, which opens on a hinge, and is air-tight, except for an opening which is partially closed by a rubber diaphragm. The diaphragm has an opening intended to be filled by the nose and mouth of the child. After the mouth of the child is cleared of all mucus it is placed in the mold. Air is first blown into the box by the mouth of the operator, so as to compress the chest; then it is let off and the air exhausted by suction, thus expanding the chest. This is repeated twenty or thirty times in a minute. Braun says he has successfully employed this apparatus in 50 cases.

Nikitin, as reported by Rabinovitch,¹_{Sept. 14} states, when Schultze's method is used, that the moment the foreign matter reaches the

posterior nares and the mouth it must be removed artificially by the catheter, or the air-passages will become blocked up again at the first inspiratory act. Nikitin recognizes, with F. H. Champneys, the great danger of traumatism in an asphyxiated child. From experiments upon cadaver insufflation, he concludes: (1) the introduction of air is performed with comparative ease; (2) even with forced insufflation, the air enters more into the lungs than into the stomach, and it never reaches beyond the pylorus; (3) in completely-filled lungs not once has artificial emphysema been found to exist.

POST-PARTUM HÆMORRHAGE.

Low Insertion of the Placenta and Placenta Succenturiata in Relation to Post-Partum Hæmorrhage.—Leopold, ⁵⁷₁₈₈₈ in a discussion on post-partum hæmorrhage before the Dresden Gynæcological Society, called attention to the causal import of low insertion of the placenta. During the first stage of labor the loss of blood is apt to be trivial and the expulsion of the child is normal, but immediately afterward a very profuse hæmorrhage may occur. The inferior border of the placenta is detached by the expulsive pains, while the superior segment remains adherent. The bleeding comes from the lower uterine segment. Under these conditions, expression causes the detached portion of the placenta to sink deeper into the vagina, but only intra-uterine, manual separation will release the adherent border. He also emphasizes the moment of placenta succenturiata in the causation of post-partum hæmorrhage.

Iodoform Gauze in Post-Partum Hæmorrhage.—O. Piering, ⁶₁₈₈₈, of Schauta's *klinik*, in Prague, publishes his experience with Dührssen's plan of plugging the uterus with iodoform gauze in post-partum hæmorrhage due to uterine atony. Dührssen uses this method after the bladder has been emptied and after forcible friction; intra-uterine irrigation with hot and cold water, along with ergot, has been employed. The uterine cavity should be thoroughly plugged with iodoform gauze after the failure of the measures mentioned, when the irritation set up will cause action and permanent contraction. Olshausen, Veit, and Fehling, however, claim that the method is neither so effective nor so harmless as Dührssen asserts. Piering has practiced the method with complete success. M. Graefe, ⁴₁₈₈₈ reports one case in which Dührssen's

method proved effective, while Born and Eckerlein⁸¹⁷ add 10 cases to the list. In a case of post-partum hæmorrhage after version and extraction on account of eclampsia, von Ramdohr¹⁵⁰ was able to check the bleeding by the intra-uterine tamponade with iodoform gauze, after the failure of massage, cold and hot douches. Heinrich Amon,⁵⁷ in a severe case of post-partum hæmorrhage from atonia uteri, used with advantage the intra-uterine tamponade, improvised from absorbent cotton saturated with creolin solution.

Intra-Uterine Compression of the Aorta in Severe Post-Partum Hæmorrhage.—Hoyos¹³² describes a case of severe post-partum hæmorrhage in which he introduced his hand within the cavum uteri, and, with the fingers, compressed the abdominal aorta through the posterior uterine wall against the vertebral column. The procedure was easily carried out and the arrest of hæmorrhage immediate. Séjournet and others have recommended this practice, not as the best means in all cases, but as of especial value when the patient is *in extremis*, and in the absence of hot-water syringe and ergot.

Cornutin.—H. Thomson¹³³ has successfully employed cornutin in the treatment of metrorrhagia of puerperal and non-puerperal origin. According to Kobert, the remedy was exhibited subcutaneously or according to the following formula:—

R Cornutin, gr. $\frac{1}{2}$ (0.048 gramme).
Water, 3iiss (10 grammes).

Mix, make solution, and add

Hydrochloric acid, gtt. iv

Or, in the form of pills:—

R Cornutin, gr. $1\frac{1}{2}$ (0.078 gramme).
Hydrate of aluminium, gr. 46 (2.98 grammes).

Add water and glycerin, equal parts, enough for 20 pills.

Dose: 2 to 3 pills.

PUERPERAL DISEASES.

By WALTER P. MANTON, M.D.,
DETROIT.

UTERINE INVOLUTION.

Uterine Involution in Pathological Conditions.—Our knowledge of normal uterine involution—the result of investigations by Heschl, Sinclair, Charpentier, Milsom (ANNUAL, 1888, vol. iv, p. 240), and Säger—has now been supplemented by the researches of Dittrich,⁴⁰⁵_{2,10,21} who reports, in a paper before the Prague Society of Physicians, the results of his examination of the uteri from 92 puerperal women who had died either from septic infection or some intercurrent disease. In all these cases careful measurements were taken, and in 32 instances microscopical examinations made. He agrees with Säger that, under normal conditions, none of the muscular tissue is destroyed during involution, but undergoes a simple metamorphosis (gradual lessening and reduction in size of fibres—Säger) to its former state. Involution is invariably retarded by infections, and generally by other abnormal processes occurring during the puerperium, the amount of disturbance varying in degree, depending, perhaps, on the time of invasion of the disease. In infection a greater or less destruction of the musculature is constantly observed, while in other morbid conditions it frequently takes place. This destruction is the result of a hyaline degeneration or a direct necrosis of the muscle-fibres. Fat may or may not be present, the amount having no connection whatever with the course of the puerperium. The tunica media of many of the arteries may also participate in the pathological changes, but this is less constant. A new formation of muscular fibres in those cases where a partial destruction of the musculature takes place was not apparent.

Involution of Uterus under Normal Conditions.—Temesváry and Bäcker,⁹⁵_{2,22,23} from a series of external measurements, find that the uterus measures immediately after labor $4\frac{1}{4}$ inches (10.6 centi-
(K-1)

metres) in length by $4\frac{1}{2}$ inches (10.8 centimetres) in breadth. During the first twenty-four hours it increases $\frac{3}{4}$ inch (1.8 centimetres) in length and $\frac{1}{8}$ inch (0.8 centimetre) in breadth. During the period of involution the daily decrease is $\frac{1}{8}$ inch (0.8 centimetre) in length and $\frac{1}{8}$ inch (0.5 centimetre) in width. It is markedly less in women who do not suckle their offspring and less rapid in primiparæ than in multiparæ. According to these authors a high temperature often hastens involution.

Ergot in the Puerperium.—Pinzani,⁴⁷²_{v.20, p.71},²⁰²_{Oss.10} states that ergot given during the puerperium either retards uterine involution or has no effect at all. Clots in the uterine cavity are, however, readily expelled, and while the escape of the lochia remains normal the drug sometimes imparts a fetid odor to the discharge. In primiparæ ergot allays after-pains and lessens them when already present. The secretion of milk is retarded, lessened, and sometimes suppressed. I have seen the milk totally suppressed for twenty-four hours following the administration of two 1-drachm (3.7 cubic centimetres) doses of equal parts of fluid extract of ergot and tinctura cinnamomi. Pinzani supports the prevalent idea that ergot is a prophylactic against puerperal infection, but finds that when absorption has once taken place the drug hastens the entrance of the poisonous material into the circulation.

Diet in Puerperal Convalescence.—Although the ideas previously held in regard to the feeding of puerperal patients have gradually undergone great change and modification during the past decade, but little has been written on the subject. A timely article on this theme has been presented by Charles Meigs Wilson.¹⁹¹_{July} He advises that, immediately after labor, the patient, should she desire it, be given some drink—preferably warm—such as cocoa, tea, or coffee, or milk diluted with carbonated water. After resting, a cup of animal-broth may be given, and, later on, an egg, or milk-toast made of stale bread, or any other form of easily-digested food. This soft diet should be continued until the bowels are moved, after which the woman may eat whatever she desires, avoiding, however, all indigestible, fatty, and leguminous articles. Contrary to the general custom, she should be urged to eat green vegetables, such as salads, asparagus, etc. Midway between each meal, and at bed-time, a glass of milk, containing $\frac{1}{4}$ ounce (14.7 cubic centimetres) of lime-water, should be given.

PUERPERAL PULSE AND TEMPERATURE.

Temesvary and Bäckér,⁹⁵ report, from a large number of observations, that the temperature of the normal puerpera does not differ from that of the healthy body under other conditions, and is subject to the same variations. In 110 cases, in which the results were carefully recorded, it was found that the average temperature in the axilla was 99.2° F. (37.20° C.), and in the rectum 99.5° F. (37.36° C.). In primiparæ the temperature is slightly higher than in multiparæ. The pulse, beginning directly after labor, gradually becomes slower during the first eight days,—the result of the condition of the blood, which receives the products of the retrograde metamorphosis of the uterus. In 77 cases after normal labor the pulse averaged 72 beats per minute, while in 32 abnormal deliveries, fever-free patients, it was slightly higher,—75 beats per minute.

Another series of observations on puerperal temperature, made by Hamilton²⁹⁷ in private practice, is of particular interest, and, although incomplete, perhaps as instructive as some more elaborately compiled statistics. The total number of cases recorded is 470, and in 30 (6.38 per cent.) of these, following delivery, the temperature rose above 100° F. (37.8° C.). Of the 359 multiparæ, 19 (5.29 per cent.) had the higher temperature, while of 111 primiparæ 11 (9.90 per cent.) were thus affected; 316 of the total number were delivered without antiseptics, with a pyrexial rise (over 100° F.—37.8° C.) in 23 cases (7.27 per cent.), while of 154 antiseptic labors there were but 7 (4.54 per cent.) with the higher temperature. Of the antiseptics used, perchloride of mercury and silico-fluoride of sodium (salufer), the percentage of apyrexia following seems rather to favor the latter.

PUERPERAL SEPTICÆMIA—PYÆMIA.

Robert Barnes,² remarks: "By the term puerperal fever we must understand 'fever in a puerpera,' but, as fevers of various kinds may assail non-puerperal persons, so they may assail puerperal. We must therefore abandon the attempt to find one definite puerperal fever, and we must recognize the clinical truth that there are puerperal fevers." These remarks from a great clinical teacher should be borne in mind by every obstetrician until the term puerperal fever has been banished from medical literature,

and a more rational nomenclature adopted in all cases associated with pyrexia during the puerperium. Hirst¹¹² has presented a carefully-prepared paper on the non-infectious fevers in the puerperium, in which he enumerates, as causes of pyrexia, emotional causes, exposure to cold, constipation, reflex irritation of any kind, cerebral disease, eclampsia, insolation, syphilis, and the exacerbation or persistence of an acute or chronic disease contracted before or during pregnancy. The differential diagnosis between some of the above conditions and infection is frequently very difficult, but can usually be arrived at by the method of exclusion.

Etiology of Septic Fever.—Although a number of able workers are in the field endeavoring to discover a special germ of puerperal infection, during the past year no great addition has been made to our positive knowledge of the subject. The great difficulty lies in the fact that apparently the same micro-organisms found in septic infection are also found in a variety of other morbid conditions, and even in the healthy body.

Smith^{685 28} has discovered in cultures from the heart-blood of a woman, dead of "puerperal fever," a streptococcus which he believes to be specific, as the same organism was found in the blood taken from the finger of a woman suffering from puerperal septic infection. He states that his germ differs essentially from all other streptococci, and from those described by Fehleisen and Rosenbach. Lustig⁴⁹⁷ has also demonstrated a streptococcus in the blood from the heart and spleen of a woman who died from septic endometritis and peritonitis, but concludes that the organism is identical with that of Fehleisen. Clivio and Monti¹⁰⁶⁵ have published similar observations.

Bumm⁹⁵ states that the micro-organisms which cause the infectious forms of puerperal fever are almost exclusively the chain micrococci, which are identical with the streptococci of ordinary wound infection. He believes that the differentiation of streptococci into streptococcus erysipelatis, etc., is purely artificial, as no morphological or biological differences exist between the streptococcus of phlegmon, puerperal septicæmia, and true erysipelas. Widal¹⁰ concurs with this opinion, as he has found the streptococcus pyogenes not only in septic infection, but in erysipelas, suppurative pleuritis occurring during the puerperium, and other conditions. Cornil⁶⁴⁸ has also proclaimed his adherence to these

views. Babes,⁵⁶⁴ however, having discovered in abscesses, etc., in two women who had died of pyæmia following abortion, the staphylococcus pyogenes, believes to have established a diagnostic point between puerperal infection, in which streptococci are found, and infection following abortion, in which the staphylococci appear. The present impossibility of differentiating even the harmless from the pathogenetic streptococci, as pointed out by Legrain,⁶⁴⁸ puts the differentiating of these organisms in disease out of the question. In regard to the supposed fact that diphtheria and scarlet fever are liable to cause puerperal septic infection, Bumm is of the opinion that this is possible only through a secondary streptococcus invasion.

Ashton,⁶ reports a case in point: Scarlatinal symptoms developed during labor, the characteristic rash appearing three days later, and, finally, fifteen days afterward, there were rigors, sickness, diarrhœa, rapid pulse, and tenderness over the hypogastric region. Puerperal septic peritonitis, according to Bumm,³¹⁷ is always the result of streptococcus invasion. At the post-mortem of a case running an acute course, a thin, flaky, light-yellowish, odorless fluid is found, the peritoneum having undergone very little change. Streptococci are found in this and in other parts of the body, the exudate being highly infectious. When the course of the disease is prolonged, the exudate becomes pus-like and loses much of its virulence.

Auto-infection.—While the majority of obstetricians believe in the heterogenetic origin of puerperal septicæmia, there are still a few who also hold to the self-infection theory. As the indiscriminate use of this term has give rise to some confusion, a definition by so well-known an authority as Kaltenbach³¹⁷ may prove useful for the future. In his address before the Third Congress of the German Gynæcological Society, June, Kaltenbach defined self-infection as “a process in which the micro-organisms which are present in the genital secretions before labor develop virulence.” He believes that the theory stands or falls on the determination whether pathological microbes exist in the sexual organs of healthy women or not. This explanation should not strengthen the position of the auto-infectionists, because it can be proved that in the majority of instances the infectious material has been introduced from without on the examining finger, instruments, or even by the patient herself. Von Szabó,⁹⁵ demands that all external inter-

ference be positively excluded before the term self-infection be employed. As it is well-nigh impossible to exclude infection from external sources, Thorn⁴⁰⁴_{No. 37} suggests that, instead of auto-infection, the words "direct" and "indirect" infection be employed to designate those cases in which the source of infection is known or can be ascertained from those in which its origin is doubtful, assuming that in both instances the *materies morbi* comes from without.

Szabó finds that the number of cases of infection increases with the number of local examinations (this applies particularly to those cases examined by students during the semester) made during and before labor, and afterward by the nearness of injuries of the sexual tract to the external world. Late infection may take place when the uterus is elevated and the cervix thrown backward into a pool of lochia containing pathogenetic micro-organisms, which may be sucked up into the womb by the contractions of that organ. In regard to the effect of pathological organisms on the healthy uterus, Strauss and Toledo¹⁴_{No. 2, 3} have experimentally placed the microbe of anthrax, septicæmia, pyæmia, etc., in the uterus of healthy, newly-delivered animals, with negative results.

Treatment. — Kaltenbach,³¹⁷_{No. 27} Poten,⁹⁵_{No. 2, 3} and others strongly recommend the prophylactic douche as greatly lessening the dangers of infection. Mermann,³¹⁷_{No. 16} on the other hand, denies the importance of the douche, and reports that in a series of 200 cases in which it was omitted there was but 1 case in which the temperature rose to 100° F. (37.8° C.). Leopold,³¹⁷_{No. 2} who has also had a large experience without the douche, believes that it should be used only following pathological births.

The therapeutics of puerperal pyrexia have been taken up by Leith Napier,¹⁵_{No. 2} who, while offering nothing new in the medicinal line, furnishes an excellent *résumé* of our present knowledge of the subject, wisely prefacing his remarks on drugs with the statement that "unless we accept the doctrine of antisepticism in midwifery as a proved necessity, and as the groundwork of all treatment, prophylactic and curative, we cannot seriously undertake to treat puerperal pyrexia."

As preventive treatment, and in beginning septicæmia, Deipser³¹⁷_{No. 23} has had good results from the daily employment of a douche of hot water 122° F. (50° C.) for six days, *post-partum*.

He believes that the heat is sufficient to kill all germs and render spores inert, and that it obviates the necessity for antiseptics.

Neswedski⁵⁵⁸_{No. 4} reports his experience with continuous irrigation of the vagina, as recommended by Snegirew, and which, he states, has been employed outside of Russia only by Pinard. The method consists in irrigating the vagina with a constant stream of warm (120° F.—49° C.) carbolic lotion, by means of Morosow's apparatus. As a result, the uterus is rapidly lessened in size, pain is quickly diminished, the discharges lose their fetid odor, insomnia is lessened, the temperature falls, while the perspiration is increased and all indications of inflammation vanish. The drawbacks in the employment of the method lie chiefly in the dangers of carbolic poisoning and certain imperfections in the douche apparatus.

Haynes²⁷_{No. 1} favors irrigation of the puerperal uterus, but points out the danger of employing this method oftener than once a day, in that the procedure is sometimes followed by symptoms precisely similar to these of septic fever, which may persist for from twenty-four to thirty-six hours. Our collaborator, Kurz,³⁸²_{No. 12} of Florence, Italy, has had excellent results from the continuous irrigation of the puerperal uterus. His method consists in washing out the uterus with a stream of antiseptic fluid, preferably carbolic lotion, by means of a Breus-Bozeman-Fritsch tube, or a catheter of his own construction, which has but one curve, which is passed into the uterus and then fastened to the patient's leg. In this way, with the woman on a douche-pan having an escape-pipe, and the fluid held in a tank above, irrigation may be kept up continuously for hours. In every case the stream should flow until the temperature falls to normal or subnormal and the pulse-rate is lowered. If no return of the pyrexia occurs after the lapse of a few hours, the douche-tube is withdrawn, to be re-inserted, however, should there be a subsequent rise of temperature. Slight carbolic intoxication, marked by smoky urine, etc., Kurz considers of little moment, as the symptoms rapidly pass away on suspension of the treatment.

Puerperal Endometritis.—Pozzi¹⁰⁵⁶_{No. 14}; ³¹⁷ reports that Massarenti has employed in the treatment of this condition and endocolpitis pure anhydrous carbolic acid. It is applied either on a tampon of cotton, which is introduced and allowed to remain in the uterus or vagina for ten minutes, or, in the case of a dilated uterus,

about $1\frac{2}{3}$ ounces (50 grammes) of the acid is injected. Generally one application is sufficient, but occasionally it has to be repeated. Charpentier,⁸⁶⁵_{Dec.10,'98} believing that puerperal infection is due to an extraneous septic agent which develops within the uterus or vagina, strongly advocates the use of the curette in septic endometritis. Chartier,²⁹⁶_{May} Porak,²⁴_{Sept.22} Rooney,⁵⁹_{June 1} Grandin,¹_{Feb.16} and many others have added their experience and indorsement of this method, so that the use of the curette, in the treatment of the condition under consideration, may now be said to have been established as a legitimate procedure. The remark of Porak, that curettement of the uterus is less dangerous than the energetic cauterization which is frequently carried out, is worthy of consideration.

Schultze, of Jena,⁸⁹_{Jan.16} has in one instance resorted to more radical measures, and removed, by supra-vaginal hysterectomy, a bicornated uterus from a primipara 21 years of age. Retained putrid placenta in the right horn of the uterus and the generally unfavorable condition of the patient were the indications for operation. After removal of the placenta it was found that the uterine wall was rotten, the decayed portion reaching to within 2 millimetres ($\frac{1}{16}$ inch) of the peritoneal covering; the left horn was also of such bad color that it was deemed imperative that the whole uterine body should be removed. This was done, the patient making an excellent recovery.

In a discussion before the Philadelphia Obstetrical Society, Parish⁴⁰_{Oct.} stated that he had seen very few cases in which the autopsy showed that laparotomy would have been of any special value. He admitted that there were such cases, however, but that it required more skill and judgment to determine when the abdomen should be opened than to do the operation.

Taylor⁶_{Nov.10} cured a patient suffering from peritonitis and sub-peritoneal abscess by laparotomy eight days after labor.

Max Runge⁶⁹_{Jan.3} again brings to the attention of the profession his method of treating puerperal septicæmia by large doses of alcohol, together with lukewarm baths. In this he is warmly seconded by A. Martin,⁴⁷⁵_{Oct.} who, however, on account of the frequent impracticability of employing the bath in private practice, favors antipyretics, preferring antipyrin. Patients affected with puerperal septicæmia appear to be immuned from intoxication, and consume large quantities of alcohol without ill effect. The great

advantage derived from the alcohol lies in its effect on the heart, which it regulates and strengthens in action. It also seems to stimulate the desire for food, which should be given in considerable quantities. One patient of Runge's took within seven days 10½ bottles of heavy wine, mostly port and madeira, and about 2 litres (¼ gallon) of cognac.

The temperature of the bath should be from 80° to 86° F. (26.7° to 30° C.). In this the patient may remain from three to five minutes, but not longer than seven to eight minutes, and not over four baths should be given in twenty-four hours,—one or two generally sufficing. Before and after the bath stimulants should be given. Besides the temperature the indications for the bath are brain symptoms, restlessness, insomnia, delirium, and sopor. The patient's pulse should be carefully watched during the process. Runge recommends that all antipyretics be avoided as useless and tending to blunt the desire for food. When persistent vomiting is present, this, as all other forms of treatment, is of no avail.

ECLAMPSIA.

Relation of Albuminuria to Eclampsia.—Lantos⁹⁵_{B.M., p. 364; Jan. 12} found albumen in the urine of nearly 60 per cent. of 600 newly-delivered women, in over 70 per cent. of 268 primiparæ, and over 50 per cent. in 332 multiparæ. The percentage was distinctly lower in cases of premature delivery and 50 per cent. lower in cases following abortion. In 10 cases where the albumen was abundant he found pus in 3 and casts in 5, but neither in the remainder. At the post-mortem examination of the kidneys of 39 puerperal women, who had had neither nephritis nor eclampsia, 15 were found to be very anæmic, 21 pale, and only 3 full of blood. Lantos concludes that, putting aside all evident and probable cases of nephritis, albuminuria is very common after labor, and refers it to a reflex irritation of the vasomotor nerves of the renal vessels. He believes that the condition has no pathological significance. Like Osthoff, he traces puerperal eclampsia to violent reflex vasomotor disturbances, and classes it as an acute, peripheral epilepsy.

In 1887 Blanc discovered in the urine of an eclamptic woman a micro-organism which, inoculated into rabbits, produced convulsions. Continuing his investigations, Blanc²¹_{May 12} has lately found a peculiar, slender bacillus, 1 or 2 micromillimetres in length, which,

also inoculated, produces convulsive phenomena and later an acute nephritis. The blood and fluids of inoculated animals have also the power of producing convulsions. From these experiments the conclusion was reached that there are some cases of puerperal eclampsia due to an organism which causes infectious nephritis, and which appears itself to generate a convulsive poison.

Eclampsia with Lithæmia.—McKeough²⁸² reports the case of a previously-healthy woman who was taken with eclamptic seizures on the tenth day *post-partum*. There was at no time albumen or casts in the urine, but a quantity of amorphous lithates were deposited. There was no history of fits or hysteria. De Witt⁵³ saw a case in which the convulsions came on twenty-four hours after labor, preceded for that length of time by total blindness. Harriet L. Harrington¹⁸⁵ reports two attacks of eclampsia in two successive deliveries of a patient occurring within one year.

Treatment of Eclampsia.—Auvard²⁹⁶ recommends, as preventive treatment, a milk diet. Should this not be well borne, he is of the opinion that all other treatment will prove uncertain. Blanc²³⁶ advises that, in severe cases of albuminuria, 3 to 4 grammes (45 to 60 grains) of chloral, well diluted with water to prevent vomiting, be administered daily as a prophylactic. During an eclamptic seizure he recommends the administration of the remedy by the stomach, either by prying open the patient's mouth and passing the stomach-tube or inserting the tube through the nostril. Nine to 10 grammes (138 to 154 grains), increasing to 16 to 18 grammes (246 to 277 grains), of chloral may be administered in twenty-four hours. Bolton Corney¹⁵ has tried citrate of caffeine in eclampsia not dependent upon renal disease, with success. Fourrier³⁵ records a case in which bleeding and chloroform failed to control the convulsions, but 2 centigrammes ($\frac{1}{8}$ grain) of nitrate of pilocarpine, administered hypodermatically, had the desired effect. Five injections were given within about thirty-six hours.

Post-partum Hæmorrhage.—Herman Born,⁸¹⁷ Becker,⁴ Eckleirlein,⁸¹⁷ and others report excellent results following the employment of Dührssen's tampon in *post-partum* hæmorrhage. This consists of packing into the relaxed uterus a strip of iodoform gauze $5\frac{1}{2}$ yards (5 metres) long, and then filling out the vagina with the same material. The gauze is removed in from twenty-four to forty-eight hours. The effect of the packing in uterine

atony is to check the hæmorrhage at once and produce contraction of the organ. No evil results have as yet been reported as following the method. Cornutin has been found by Thomson³¹⁷ to be of particular value in atonic bleeding following delivery and in abortion, and also in metrorrhagia and menorrhagia due to endometritis, metritis, and disease of the uterine adnexa. He finds that, given in doses, hypodermatically or by the mouth, of 2 to 10 milligrammes ($\frac{1}{32}$ to $\frac{1}{8}$ grain), the action of the drug is manifested in from four to twenty minutes. One great drawback in the use of the drug is the expense.

MISCELLANEOUS PUERPERAL DISORDERS.

Post-partum Shock.—Ferguson³⁶ assigns Crédé's method of placental expression as a cause of *post-partum* shock. He reports 3 cases in which the labor had been reasonably easy, without excessive hæmorrhage or severe operation. Following expression of the placenta, there arose symptoms of syncope, shock, unconsciousness; feeble, rapid, and irregular pulse, sometimes imperceptible at the wrist; dilated pupils; shallow, irregular breathing; cold, clammy sweat; vacant, torpid face, and insensibility to pain. Ferguson's theory of the cause of shock in each case is that one or both of the enlarged and tender ovaries were squeezed between the compressing hand and the hard, contracted uterus. The uterus, often lying obliquely in the pelvis immediately following labors, brings the ovaries within easy grasp.

Phlegmasia Alba Dolens.—Widal¹⁰¹⁰ has discovered the *streptococcus pyogenes* in this condition as well as in erysipelas and other puerperal states, and believes this organism to be the cause. Vilon¹⁰¹⁰ points out the similarity between *post-partum* phlebitis varicosa and phlegmasia, for which it is often mistaken. This condition may occur in dilated or superficial veins, and the prognosis is usually good. The differential diagnosis lies in the initial chill, which is generally absent in phlegmasia, and the ecchymoses, which remains for some time. The treatment consists in rest, and, when inflammatory action has ceased, elastic pressure.

Bond¹⁰⁴ reports the case of a colored woman, 33 years of age, II para, who was taken with pneumonia thirteen days after labor. A month and a half later she suffered from pain in the left hip, above and a little behind the trochanter major. Two weeks

afterward the leg began to swell from the groin to the foot, the pain beginning a day or two before the swelling and extending along the line of the femoral artery. At the close of the second week of the swelling the patient complained of chilliness, and two days later the right knee began to swell, accompanied by pain behind the great trochanter and in the groin. Bed-sores developed over the sacrum, and the patient finally succumbed to the condition twelve weeks after labor.

Puerperal Insanity.—Savage²_{Dec. 1, 76} states that puerperal insanity is less curable than generally supposed. Five per cent. of acute cases prove fatal and 20 per cent. remain permanently afflicted. Neurotic persons are more liable to take on septic changes, and cases from septic infection most frequently take the acute form and prove fatal. He thought that statistics pointed to a preponderance of such cases among the upper classes. Christian²³_{July} concludes that, while in many cases there is a neuropathic tendency which is developed by the severe pangs of childbirth, there are others dependent on other causes, such as produce insanity and melancholia in general. His observations lead him to think that there is a marked discrepancy between the statistics of insane asylums and the reports of obstetrical writers, and he is not inclined to classify those cases which, according to Churchill, “disappear under the operation of a smart purgative or opiate.”

Our corresponding editor, Sprimont, of Moscow, reports a new disease, described by Korsakoff,⁵⁸⁰_{Nov. 12} under the name “psychose polineurotique ou cérébropathie psychique toxique.” This occurs especially during puerperal infection, and is characterized by a multiple neuritis, to which is added a peculiar psychical state,—a disassociation of ideas and a feebleness of memory. The patient is generally very excitable, irritable, and sleepless, and has illusions of the organs of sense. More rarely there is apathy present. The general health is enfeebled by reason of frequent vomiting and loss of appetite. A slight fever is present, and the patient becomes emaciated. A long and tedious convalescence finally terminates in recovery, or the patient succumbs to enfeebled condition. The author reports 16 cases of the disease.

Ischuria.—While not denying that the explanations of Olshausen (kinking of urethra), Schatz (paresis of the ligamentous attachments of the bladder to the symphysis), and Schwartz

(that relaxation of the abdominal walls) may give rise to ischuria, Schultz³¹⁷_{No. 30} believes that in the majority of cases the condition is due to inability on the part of the patient to pass the urine in the dorsal recumbent position. Since teaching patients to urinate while on the back, before operations and labor, he has had no cases of ischuria in the second clinic in Buda-Pesth.

Glycosuria and High Temperature.—Cameron²⁸²_{Jan.} puts on record two curious cases in which sugar (glucose) appeared in the urine of the puerperæ as the result of nervous influences. In one the failure to receive an expected letter and detention in hospital were the assigned cause, while in the other the severe nervous strain of labor gave rise to the condition. In neither was the amount of urine increased. High temperature accompanied the glycosuria, and the amount of sugar diminished as convalescence progressed.

Peptonuria in the Puerperium.—This important subject has been investigated by several observers; among the last is Thompson,⁶⁹_{Oct. 21} who has carefully examined the urine of 11 puerperæ, with the result of finding peptones in 3 cases. According to this author, peptones may appear in the urine from the second day on, but it is not a constant phenomenon.

Inversion of Puerperal Uterus.—Kézmárszky⁵⁹⁵_{No. 3, '98} reports the case of a primipara, 20 years old, who, while on the commode, four days after labor, suffered a complete inversion and prolapse of the uterus. Reposition was attempted half an hour after the occurrence of the accident, and continued two days without result. This was followed by fever and general indisposition, during which the uterus, which lay in the vagina, became markedly smaller. One year later the patient was again examined, and a normal uterus found, the inversion having disappeared. Kézmárszky therefore concludes that under favorable circumstances—long decubitus and a recent case—the self-reposition of an inverted uterus may not be of so rare occurrence.

Puerperal Rheumatism.—Hamill¹¹²_{Nov., '98} records 2 cases of this curious and rare disease. The condition affects, by preference, the knee-joint or some large articulation; is painful and tenacious, but is not associated with marked febrile disturbance or cardiac complications. Hamill believes that the etiology of the disease must be sought in the germ theory, as the theory of Tison—that

the condition is due to the constitutional changes occurring during pregnancy and the puerperium—seems untenable. The prognosis of the disease is unfavorable as regards the use of the limb. The treatment consists of the usual remedies given in rheumatic affections,—salicylates, alkalies, counter-irritants, electricity, and local rest.

THE PUERPERAL BREAST.

The long list of evil results to the contrary notwithstanding, E. F. Cordell⁹_{Am.} asserts his belief in gentle friction of the breast in mastitis and threatened abscess. In eighteen years' experience of the method he has seen but one small subcutaneous collection of pus in such cases, while formerly he had had many abscesses.

Relation between Breast-feeding and Malaria.—Rouvier²³⁶_{May} states that, in his experience, nurses suffering from malaria do not infect the nursling, but it is advisable to change nurses, as the child is liable to gastric disturbances. If both nurse and child suffer from malaria the conditions are quite independent. In nurslings malaria is easily mistaken for cramps, gastroenteritis, etc., and may therefore receive improper treatment. When nurse and child are affected on account of the injurious effect of the milk on the latter, a healthy nurse should be substituted. As quinine is badly borne by nurslings when administered *per orem*, Rouvier advises giving it by hypodermatic injection.

DISEASES OF THE NEWBORN.

By ANDREW F. CURRIER, M.D.,

NEW YORK.

PROPHYLAXIS.

PROPHYLAXIS is a not less important consideration for individuals at the earliest period of their career than at subsequent periods. In fact, the importance of the matter should be recognized before birth or even before conception, for how can it be expected that those who are unsound in body and mind can have healthy offspring? One consideration which should not be neglected in newborn infants has recently been referred to by Weller, ⁵¹ and concerns the use of the abdominal bandage, the evils from which, especially when the bandage is tight, as is frequently the case, being numerous. It prevents the easy passage of flatus through the intestines, is an obstruction in sneezing and coughing, and instead of being a preventive to hernia, it usually favors it, for, as usually adjusted, it protects the stronger parts and leaves the weaker ones unprotected.

INJURIES OF THE NEWBORN.

Not a little can be said in regard to the injuries of the newborn, and Parvin ¹⁰⁰⁰ _{v. 1, p. 288} has undertaken such a task in his usual felicitous style. The so-called *caput succedaneum* is the most common of such injuries, and may consist merely in an effusion of serum or sero-sanguinolent fluid in the cellular tissue of the scalp, or there may be an effusion of blood, the tumor being thus a true hæmatoma, especially if the effusion has taken place between the periosteum and the cranial bone. The tumor may be the result of thrombosis, and may not be apparent for one to three days after birth. It most frequently appears in the parietal region, and may vary in size from a pigeon's egg to a small apple. Treatment for such conditions, and for contusions and lacerations due to unskillful use of the forceps, should be of the simplest character.

(L-1)

Parvin quotes Gowers as stating that the palsies caused by pressure during parturition are usually transient in character. Of the fractures which newborn infants experience, the most common are those of the humerus, less frequent are those of the clavicle and scapula, and still less common are fractures and dislocations of the bones of the lower extremities.

CARE OF THE UMBILICUS—ANTISEPSIS.

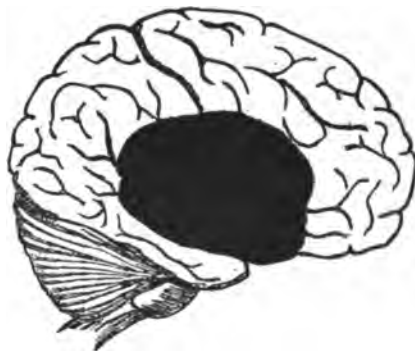
Penrose ¹⁰⁰⁰_{v.1, p.388} discountenances the fashion which has prevailed in certain quarters, of omitting to ligate the cord. It should be done carefully and thoroughly, with due reference to the possibilities of sepsis. Penrose believes that assertions that diseases of various kinds have resulted from ligation of the navel are not to be credited. Apropos of the universal value of antisepsis, Fagonski ⁵¹_{Oct.} recommends disinfection of the navel-stump in a 5-per-cent. solution of carbolic acid, and subsequently a dressing of plaster of Paris. Or Runge's method may be used, the dressing being salicylic acid and starch, or talc powder may be employed, the stump then being wrapped in absorbent cotton. The objects of such dressing are, of course, the most rapid and complete mummification possible of the stump, and the statistical results of several series of experiments made by Fagonski seemed to favor the plaster of Paris for such a purpose.

Epstein ^{388 26}_{Feb. 9, Apr. 1} also dwells upon the importance of antisepsis in the care of the newborn, insisting that the mortality in infants is not due to spontaneous intra-uterine infection, but to infection which enters the infantile circulation from without, and especially by way of the umbilical cord. Other avenues of infection are the mouth, genitals, and the bruised external surface of the body. For the protection of the umbilicus Epstein advises dressings of salicin, iodoform, or sublimate. He also insists on the proper use of antiseptics by attendants. An additional precaution consists in the use of a small quantity of permanganate of potash in the first bath which is given to the infant. Should hæmorrhage occur from the umbilicus, Dakin ⁵¹_{Sept.} recommends the following course of treatment: In the intervals of respiration, when the abdominal walls are lax, a hare-lip pin or long needle is made to pass through about an inch of the abdominal wall at the level of the lower edge of the umbilicus, the tissues having first been pinched up between the

thumb and index finger. The intestines will have been pushed out of the way by the fingers, and the needle will pass under the hypogastric arteries. If the hæmorrhage does not cease at once it will be because it proceeds from a vein, and it may be at once arrested by passing a figure-of-8 ligature around the needle.

INTRA-CRANIAL HÆMORRHAGE.

Hirst¹¹²_{Mar.} has reported two cases of intra-cranial hæmorrhage. In one the child was delivered by the breech, both its parents giving a history of hæmophilia. Hirst thinks the effusion into the cranial cavity occurred by exudation during the extraction of the head. In the second case the labor was long, but not instrumental. The hæmorrhage was probably due to long-continued constriction of the child's neck, while the head was projecting from the vulva, passive congestion of the brain resulting. The accompanying cut shows the appearance and location of the clot which was found at the autopsy.



INTRA-CRANIAL HÆMORRHAGE.
 (University Medical Magazine.)

THE BLOOD OF THE NEWBORN.

Scherenziss³¹⁷_{Feb. 8, Apr. 1} has made a series of investigations in regard to the condition of the foetal blood at birth, with the following conclusions: 1. Foetal blood has a lower specific gravity than that of the adult. 2. Foetal blood is deficient in hæmoglobin, but rich in stroma. The proportion of hæmoglobin to that in the adult is as 76.8 to 100. 3. The fibrin in foetal blood is to that in the adult as 2 to 7. 4. The foetal blood is not suitable for quantitative analysis by diffusion in saline solutions, the elements of the blood-globules, especially the hæmoglobin, being disintegrated in such solutions. 5. Foetal blood is richer in salts than adult blood. There is a marked preponderance of chlorides and salts in the serum. 6. The foetal blood has a larger proportion of sodium, and is relatively poorer in potassium than adult blood. 7. The quantity of uncombined potassium and sodium in foetal blood is notably less than in adult blood. 8. The sex and size of the child do not appear to have any influence upon the quality of the blood at birth.

WINCKEL'S DISEASE.

Strelitz,¹⁵⁸ reports with great minuteness a case of this rather rare disease, which has usually occurred as an epidemic when observed heretofore. It was so observed by Bigelow in 1875; that is, four years prior to Winckel's publication.

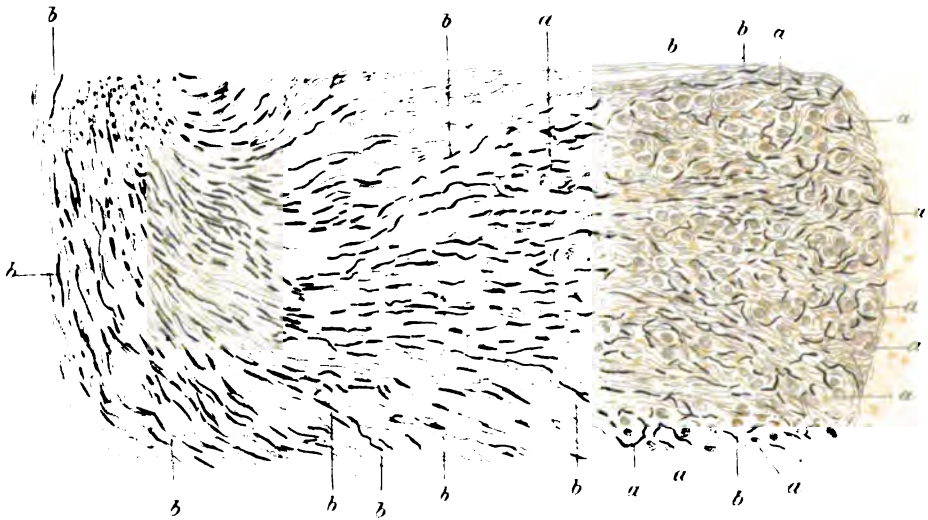
Bar and Grand 'Homme,²⁴ have also reported upon what they consider an identical disease, which they call the hæmaturic bronzed disease of the newborn. They maintain that Winckel can lay no claim of priority in the observation of the disease, since it had been previously described by Pollack and Laroyenne. Parrot called the disease hæmorrhage of the renal tubules (*tubullématique rénale*), such being the conspicuous lesion. Both Strelitz and Bar and Grand 'Homme refer it to a microbial origin, and the cultures of Strelitz are reproduced in the adjoined plate: (1) gelatin culture of the streptococcus in Winckel's disease; (2) potato culture of the streptococcus in Winckel's disease; (3) section through the entire kidney; *a, a, a*, glomeruli in the cortical substances; *b, b, b*, masses of hæmoglobin in the medullary substance of the kidney. The two significant clinical phenomena of the disease are hæmaturia and bronze discoloration of the skin. To this might be added rapid progress and fatal termination.

CONVULSIONS.

This condition, so common in almost any period of infancy and early childhood, is common enough with the newborn. Whether it occurs so early in life with those who are of excessively neurotic temperament and inheritance I do not know, and find nothing in the literature of the year upon the subject. I have seen it, however, as the result of a violent and difficult birth. It does not necessarily signify that the forceps have been used maladroitly, though it probably has that significance at times. It may even occur after natural labor which has been long and arduous.

FACIAL PARALYSIS.

Of the so-called "birth-palsies" of Gowers, Stephan,² refers to a form which is caused by the pressure of the forceps, and another which is due to pressure in the course of a tedious labor, or to deformity or new-formation in the pelvis of the mother. In both these forms the paralysis is not usually of long duration. In a



1.2.3. Winckel's Disease (Strelitz).

I. II. Pemphigus (Strelitz).

Archiv für Kinderheilkunde.

third form, however, in which there is also difficulty with the hearing upon the paralyzed side, the prognosis is absolutely bad. In a reported case there was permanent injury to all the nerves controlling the left side of the face and the *velum palati*. Henoeh reports a similar case. Jolly¹⁸¹ has also treated this subject in an able paper, and reported a case with the resulting phenomena as the child and the disease developed.

TETANUS AND TRISMUS.

Labonne¹⁰⁸ relates the curious fact that in some of the Faroe and Hebrides Islands tetanus neonatorum is endemic to a remarkable degree. In St. Kilda the total number of children of 14 couples who were living on the island in 1880 had been 125. Of this number 84 had died during the first fourteen days of life from trismus. There are no horses upon the island, hence such an origin must be eliminated; but the inhabitants subsist chiefly upon the oil and flesh of sea-birds, burning their guano for fuel. It was concluded that the cause of the mortality was to be found in these facts, the disease probably being the result of a microbe.

The infectious nature of the disease was more thoroughly demonstrated by Lop,⁴⁶ who experimented with pus obtained from the umbilical scar of an infant which died from tetanus. This pus produced fatal septicæmia in guinea-pigs. Bacilli were found in cultures of the pus, and inoculations of animals with these bacilli produced fatal tetanus. The same disease was also produced by inoculations of mud from a pool in which had been washed the cloths which were used for dressing the umbilical stump of the child who died as narrated. Lop adopts the conclusions of Beumer, that tetanus neonatorum has the same etiology as traumatic tetanus in adults, which may be either telluric or equine; also that the bacilli of tetanus penetrate the umbilical wound through the medium of soiled hands or dirty dressings. Evans²³² narrates a case in which the possibility of infection from equine tetanus is sustained by certain facts, but the evidence is not of the most convincing character. The treatment of this disease has usually been *nil*, or something equally unsatisfactory. Two cases are reported, however, one by Shaw,¹⁰⁹ the other by Tordeus,²⁷⁶ in which it resulted in a cure. In the former 60 grains (4 grammes) of chloral and 150 grains (10 grammes) of potassium bromide were

given per rectum in the course of forty-eight hours, treatment being commenced twelve hours after birth. In the latter small doses of chloral were given by the mouth, and the treatment was continued nearly a month before the patient was cured. Soltmann's plan of treatment, as quoted by Tordeus, is as follows: Evacuation of the bowels by means of calomel or rectal enema, warm bath every three hours, plenty of food, hydrate of chloral every hour for twenty-four hours, and if the disease still persists the chloral may be discontinued and 3 centigrammes ($\frac{1}{2}$ grain) of musk be given every three hours, or 3 to 5 drops of tincture of amber with musk.

Peiper ¹⁵⁸_{Aug. 11, 1911} has made extensive culture and inoculation experiments with pus from a case of tetanus neonatorum, and demonstrated the identity of wound and inoculation tetanus with that disease in the newborn.

INFECTIOUS DISEASES.

The list of infectious diseases of the newborn is not a small one. In addition to those which have already been referred to, and which have heretofore been considered either as nervous or nervo-infectious, many could be added in which the infectious nature is unquestionable.

Cholmogoroff ⁸⁴_{Aug. 10} finds no micro-organisms in the umbilical cord of the newborn child. Such organisms when found in the stump have come from without. The pathogenic bacteria of the umbilical cord are identical with those of puerperal fever; staphylococcus albus, *S. aureus*, *S. citreus*, and streptococcus pyogenes have all been found upon the stump of the umbilical cord. Cholmogoroff thinks the best dressing for the stump, the best means of keeping out bacteria from the circulation, is plaster of Paris. Karlinski ⁵¹_{Oct.} has experimented on lines similar to the foregoing with similar conclusions, but he suggests, in addition, that infection might be transmitted within the uterus; also that septic material might be aspirated, or be taken in with the milk of the mother if the latter were in a septic state. Cultures of milk from septic puerperal women revealed five varieties of staphylococcus pyogenes. Eitner's experiments upon rabbits also show that infection can take place through the digestive tract. The transmission of tuberculosis from mother to fœtus has long been a disputed question. Sanchez-Toledo ¹⁵¹_{June 27} has experimented upon pregnant guinea-pigs,

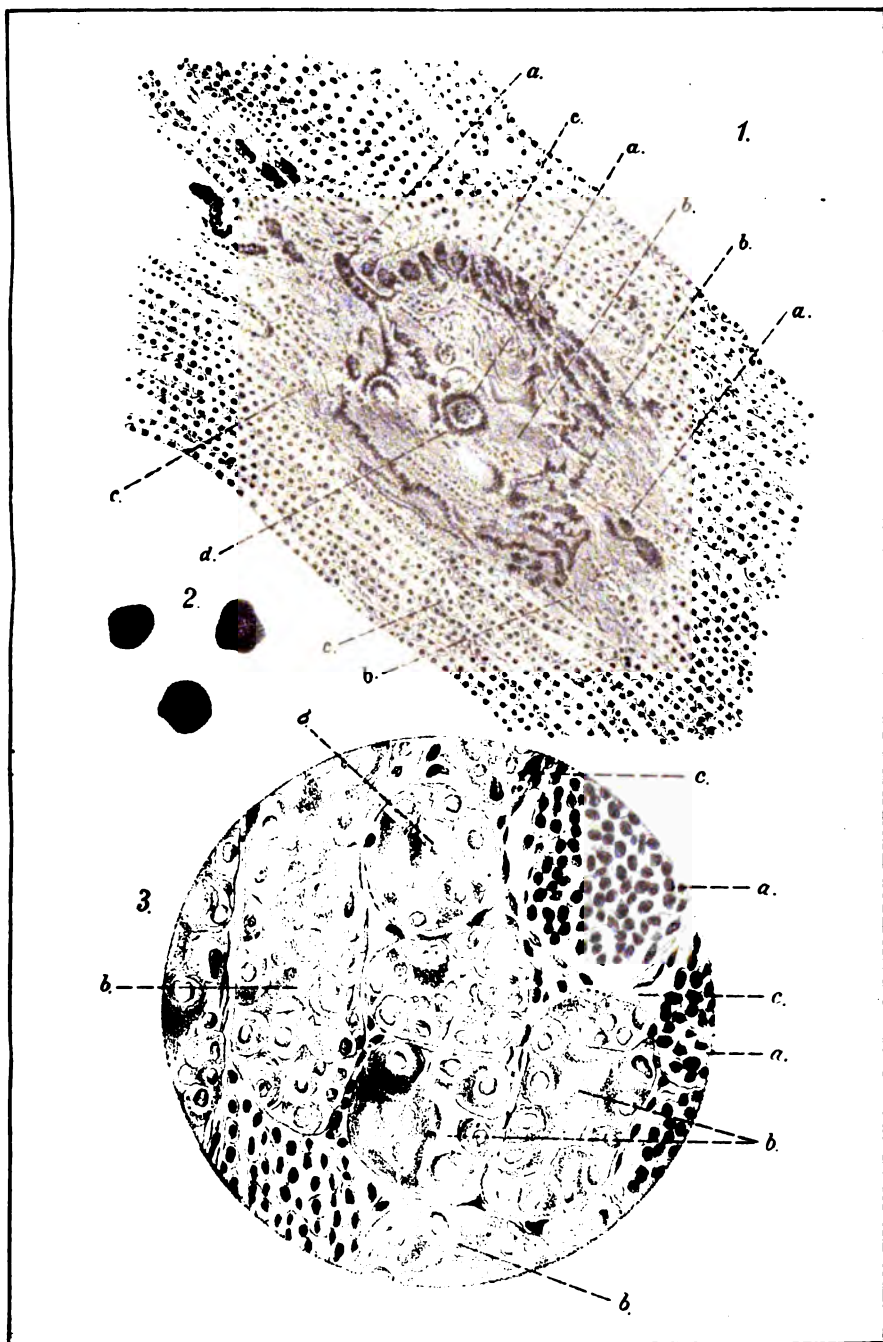
injecting pure cultures of Koch's bacillus into veins, pleural cavities, and subcutaneously. The mothers almost invariably became tubercular, but in no case was the foetus infected with the disease. Malvoz and Brouvier,⁶ on the other hand, were able to demonstrate the presence of tubercle in a foetal calf, the mother of which was tubercular. Furthermore, Huguenin²³⁰_{Nov. '38} found tubercles in the pleura, lungs, and spleen of a premature child, who died at the age of 7 weeks, and in a reasonable argument he concludes that it proves the possible existence of tubercle in the foetus or newborn child. Other diseases which have been transmitted from mother to foetus, and which have been recognized as inherited, are syphilis, small-pox, measles, scarlet fever, anthrax, erysipelas, septicaemia, pleuro-pneumonia, typhoid fever, recurrent fever, malaria, and possibly yellow fever, cholera, and some others. It yet remains to be explained just how the communication of these diseases is effected, for Wolff²²_{Sept. 4} and others who have experimented in this field have seldom been able to find pathogenic bacilli in the foetal tissues, and Verneuil¹⁷_{July '30} reports a case in which a pregnant woman had repeated and severe attacks of erysipelatous lymphangitis, gave birth to an ill-developed child at the seventh month, and yet, notwithstanding the virulence of the disease, no bacilli were found in foetal tissues, nor was there any evidence that the disease had ever passed from mother to child. If such cases may be considered as showing that infection of the foetus takes place, as Wolff has suggested, either by means of hæmorrhage from the maternal placenta or by simple contiguity, neither of which hypotheses, however, is very satisfactory, it would seem like knocking a hole in the bottom of the whole theory of infection by bacteria, all of which tends to show that there is still much to be learned on this subject, and probably something to unlearn.

Felkin³⁶_{June} reports two interesting cases in which malaria seemed to have been communicated to the foetus by the father. So far as could be ascertained, the mothers were quite free from the disease. The disease was manifested during intra-uterine life by paroxysms of shaking on the part of the foetus. After birth the children were found to have enlarged spleen, and they suffered from typical paroxysms of malarial fever. As has been suggested, this fact places malaria by the side of syphilis, in that the foetus may be infected through the spermatozoid, the mother remaining uninfected.

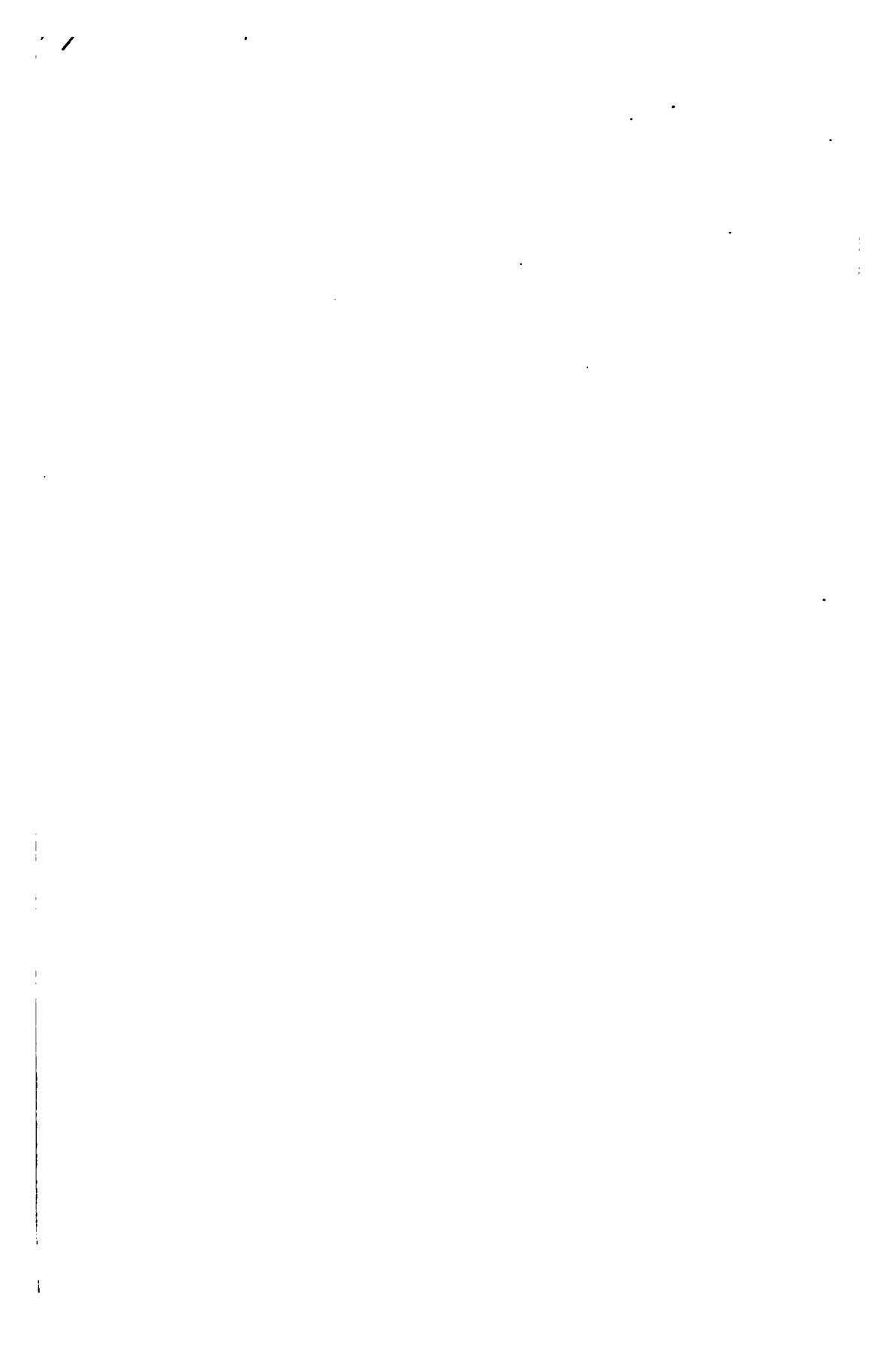
Baginsky²⁰_{Mar. 3} reports a case of pyæmia in an infant 17 days old, who had suffered from omphalitis and had been under observation but one day. Severe jaundice was present, there were cocci and bacilli in the umbilical secretions, and swellings in the arms and legs. The umbilical cicatrix was of a greenish color, there were broken-down clots in the umbilical arteries, the spleen was large and soft, and the kidneys and liver normal to the naked eye. The kidneys contained many embolic foci. The lymph-channels of the lungs abounded in streptococci, and similar microbes were found in the liver. Magnified sections and cultures are shown in the plate presented herewith. 1. Necrotic mass in the medullary substance of the kidney; *a*, blood-vessels filled with cocci; *d a*, central vessel containing cocci; *b*, necrotic renal tissue; *c*, normal renal tubules. 2. Colonies of cocci on gelatin. 3. Section through cortical substance of kidney; *a*, glomeruli; *b*, crooked tubules with partly necrosed epithelium; *c*, round granules in interstitial tissue resembling cocci. That substances of various kinds may be transferred from mother to foetus has frequently been demonstrated by use of coloring matters and pigments. Hence we can see no obstacle of a mechanical character to the transmission of pathogenic bacilli. Legrand and Winter⁷³_{Jan. 2} report an interesting case of hereditary lead poisoning. The father and mother had suffered from plumbism, and five of their children had been born dead. The sixth lived 15 days. At the autopsy the kidneys were found to be very small, granular, and sclerotic. There was general circumlobular cirrhosis of the liver, with islands of fatty degeneration in the periphery of the lobules. Throughout the circumlobular fibrous tissue a solution of ammonium sulphide gave an abundant precipitate of fine black grains within the cells, which was slowly dissolved by acetic acid. The liver weighed nearly 2 ounces (62 grammes), and contained about 3 per cent. of lead.

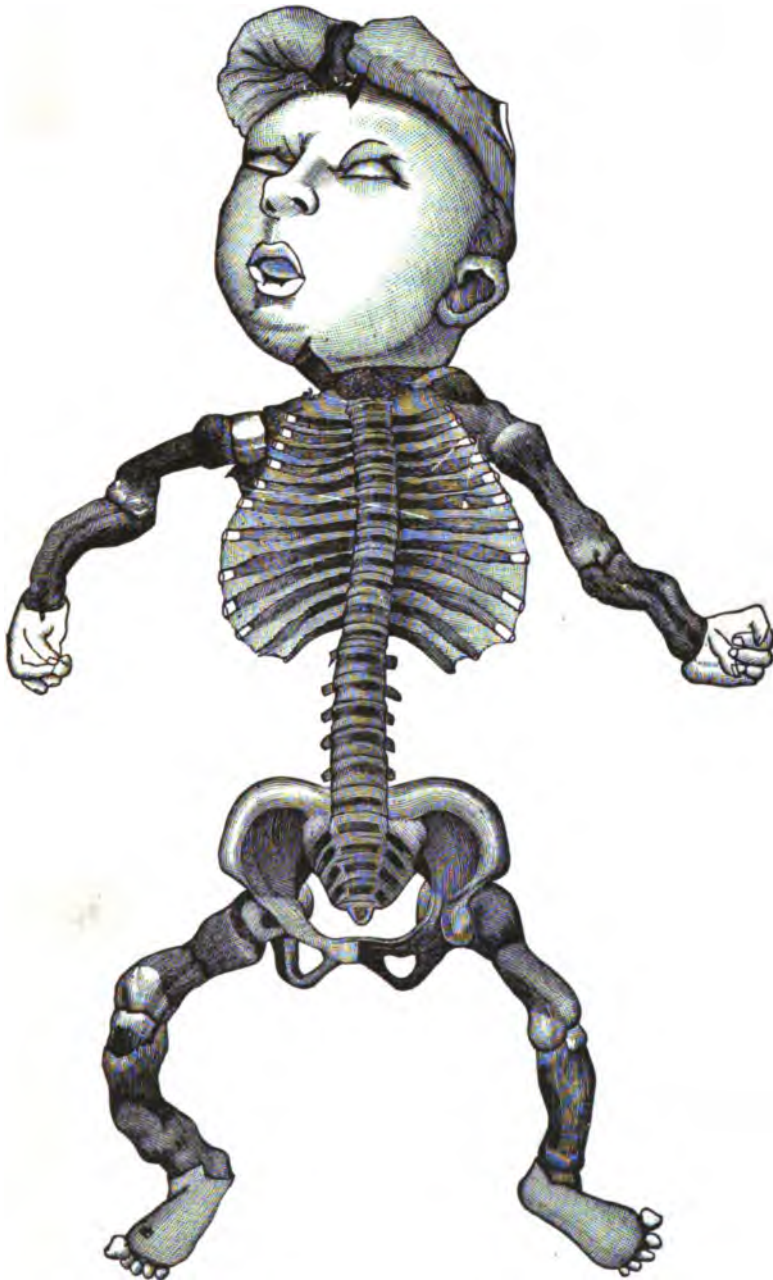
DISEASE OF THE BONES.

Stilling²⁰_{Mar. 3} reports a case of *osteogenesis imperfecta*, a drawing of which is here reproduced. The child was a female, born at the eighth month, and the essential peculiarity in the skeleton was the great deficiency of bony substance and those structures from which bone is developed. It is possible that a history of syphilis would account for the defects



Pyæmia (Baginsky)
Virchow's Archiv.





IMPERFECT OSTEOGENESIS.
(*Virchow's Archiv.*)

DISEASE OF THE MOUTH, NOSE, AND THROAT.

Among diseases of the mouth in newborn infants nothing is more common than thrush, the product of the fungus *oïdium albicans*, or of *mycoderma vini*, or of *saccharomyces albicans*, according as we follow the views of Robin or Grawitz or Riess. Its greater prevalence among the poor and the dirty would also support Parrot's theory that it is closely associated with malnutrition and filth.

Simon,⁸⁵_{June 20} in one of his clinical lectures, has stated his views concerning prognosis in diseases of the respiratory passages. He believes that coryza in the newborn has always a grave prognosis, for the accumulation of mucus in the nasal fossæ must result in dyspnœa, insomnia, and fever. The more chronic the process, the more serious the prognosis. Besides, the process has a tendency to extend to the larynx, the trachea, and the bronchi. If the coryza depends upon syphilis, the symptoms may not be so acute as in the ordinary form of the disease, but there will be nasal obstruction, thickening of the nasal mucous membrane, and the formation of crusts, under which there will be a raw mucous membrane. The prognosis of diphtheritic coryza is that of diphtheria. Concerning laryngitis, there is a class of cases peculiar to the newborn, and the prognosis may be serious if there be involvement of the aryteno-epiglottic folds with œdema. False croup does not attack the newly born, but there may be spasms of the glottis accompanying laryngitis. True croup is very rare in children under 2 years of age. Œdema of the glottis in the newly born frequently accompanies the severe forms of laryngitis, and almost always results fatally.

Caillé¹⁵⁰_{Mar.} has contributed an interesting paper on the value of the different methods of operation in croup. It is presupposed that in very many cases death would result unless some form of operative interference were adopted, and also that the best results are to be attained when the disease is simply catarrhal in character. An operation in croup only aims to overcome existing stenosis, hence such an operation should be preferred as will interfere least with the healing of the diseased mucous membrane. The choice of operations will lie between tracheotomy, intubation, and the immediate opening of the air-passages with the tracheotome. The last method is seldom to be preferred on account of

its great danger, even in skillful hands. Tracheotomy by the ordinary method has also serious objections, not the least of which is the danger of infection from the wound which is made. The choice must, therefore, remain with intubation, which is a simple and easily learned operative method. The advantages of intubation are: It provides the necessary air without making a wound; it may be done early and without an anæsthetic; the after-treatment is simple; it is especially useful for very young infants. On the other hand, the tube may become obstructed by secretions or membrane, and food and medicine may pass through it into the lower air-passages. The following may be considered as indications for intubation: 1. Simple catarrhal stenosis. 2. Primary croup and diphtheria with laryngeal stenosis, especially in cases in which there is little possibility of proper treatment after tracheotomy.

DISEASES OF THE LUNGS.

Dohrn¹¹⁸ ascertained by a careful series of experiments that respiration in the newborn is chiefly thoracic. The movement of respiration begins above and steadily progresses downward. Measurements with the spirometer showed that the exchange of gases with infants is much greater than with adults. During the first three days of life the volume of inspired air steadily increases; on the fourth day it begins to diminish, but it soon increases again, so that by the end of the first week the exchange of gases is about one-third greater than on the first day of life. Air does not penetrate all the alveoli with the first inspirations, many of them remaining undilated, so that even after some hours the lungs are still partly atelectatic, which is a very important fact from a forensic point of view.

In asphyxia of the newborn O'Dwyer¹ favors mouth-to-mouth inflation, the infant's nostrils being closed and a moderate degree of pressure used at first to prevent forcing the epiglottis over the larynx. He has never failed to expand the lungs by this method, and has often succeeded in establishing normal respiration after working half an hour or more. He considers this a better method than inflation with a catheter, since most of the air introduced by this instrument returns at its side. Reynolds¹⁵⁸ prefers inversion of the child to establish respiration, the child lying upon the back, head downward, upon the forearm of the operator, whose

fingers are hooked into its shoulders. The arms of the child fall downward as the hands of the operator are depressed, and the chest is thus dilated. The pressure being then suddenly removed a respiration takes place. Such a movement also favors the removal of mucus from the air-passages.

Townsend¹⁵¹ reports a case of lobar pneumonia in a male infant 8 days old, who died after an illness of thirty-six hours. An autopsy was made, and red hepatization of the entire left lower lobe was found, the lobe being enormously distended and completely solidified.

DISEASES OF THE STOMACH.

Van Puteren⁵¹ sought to determine whether there were micro-organisms which play a physiological rôle in the stomach, as Escherich determined was the case in the intestine, the microbe in the latter case being the *bacillus lactis aërogenes*. Examination was made of the contents of the stomach of 40 healthy infants between the ages of 4 and 70 days, the infants having first been fed with breast-milk or with a mixture of milk and water. The contents were removed with all possible care, and 110 plate cultures were made, 15 from those who had been fed artificially and 95 from the breast-fed. Of the latter 59 were suffering from thrush, the remaining 36 being free from it. Only a few micro-organisms were obtained from the 36. Those who were artificially-fed had 20 times more micro-organisms than those who were breast-fed, and those who had thrush had 40 times as many micro-organisms as those who were free from it. If the mouths of those who were without thrush were cleansed before and after eating, the contents of the stomach were found free from bacteria in 16 per cent. of such cases. *Oidium albicans* was not found in artificially-fed children who were free from thrush. *Bacillus lactis aërogenes* was found in 37.6 per cent. of those who were nursed at the breast and in 45 per cent. of the artificially-fed. Non-soluble cocci were found in 12.9 per cent. of the breast-fed and in 54.4 per cent. of the artificially-fed. *Oidium lactis* was found in 12.9 per cent. of the breast-fed and in 27.3 per cent. of the artificially-fed. *Staphylococcus pyogenes aureus* was found in 16.4 per cent. of the breast-fed and in 27.2 per cent. of those fed on cows' milk, but all the children in whom this was found seemed perfectly healthy. *Bacillus subtilis* was in 11.7 per cent. of the

first and 36.8 per cent. of the second class. *Bacillus butyricus Heneppe* was found in every case in which cows' milk had been given. Fine, short, rod bacteria were in 9.4 per cent. of the first and in 18 per cent. of the second class. *Bacillus fluorescens liquefaciens* was in 27.3 per cent. of the second class. It was concluded that no single variety of bacteria was found so constantly or in so great numbers as to exercise a physiological function upon the digestive activity, also that the number of them does not vary greatly during the different stages of digestion.

Faucher⁵¹ found that irrigation of the stomach could be practiced as readily upon the newborn as upon adults, if only a suitable tube and funnel were used. The infant should be held with the head well forward to permit the ready exit of matter which flows back into the pharynx, the arms being secured with a napkin, which is fastened around the neck. Ebstein's plan of keeping the child in the dorsal position during irrigation is entirely disapproved. Vomiting may sometimes be arrested after a single irrigation, or it may be necessary to irrigate two or three times for two or three days. With such treatment medicine is often entirely unnecessary.

Moncorvo,²⁵⁶ divides the gastropathies of infancy into two groups, one including cases in which the food is at fault, and the other those in which there is general weakness of the organism, with or without proper alimentation. Dyspeptic disorders frequently coincide with dilatation of the stomach, and such disorders, if unrelieved, soon result in athrepsia. In the newborn the dyspeptic condition is signified by slowness in the gastric digestion. The milk which has been taken is vomited in a coagulated condition, after being retained an hour and half or two hours. If the food is not vomited its casein passes out in the stools in an undigested condition, being incompletely peptonized. In these disorders of the stomach examination of the stools is of great importance, but still more important information may be obtained by the study of the gastric juice. The reagent which Moncorvo uses in such study is the phloroglucide of vanilla, which is very sensitive in the presence of hydrochloric acid. A similar effect may be obtained by the use of a 5-per-cent. alcoholic solution of resorcin, to which 3 per cent. of cane-sugar is added. The usual trouble in the dyspepsia of the newborn is a deficiency

of free hydrochloric acid in the gastric juice; hence this acid is indicated.

DISEASE OF THE KIDNEYS.

The question often arises as to the condition of the kidneys in children who are born of mothers who suffered with eclampsia during labor. Moussous,¹⁸⁸ has made a series of investigations upon this subject, and presented microscopic preparations to the Society of Anatomy and Physiology at Bordeaux. The specimens were prepared from the kidneys of an 8 months' fœtus whose mother suffered from anasarca during labor, passed 6 grains (0.4 gramme) of albumen, and had 16 eclamptic convulsions. The infant died when 10 days old without convulsions. The microscopic preparations showed no changes in the glomeruli nor in the crooked tubules. There was nothing of importance except evidence of hæmorrhage in the collecting tubules. This is a common enough symptom, and may have had no relation to eclampsia in the mother.

DISEASE OF THE INTESTINES.

Schoppe's⁵¹ view concerning the serous discharges of choleric form enteritis in the newborn is that while they are undoubtedly significant they do not account for collapse. This phenomenon has decided analogies with traumatic shock, and is produced under the influence of an abnormal afflux of blood to the digestive organs, to the detriment of other parts of the body. On the other hand, the phenomena of fermentation and other morbid processes which may take place in the intestines would produce an effect upon the splanchnic nerve, the abnormal excitation of which would lead to temporary paralysis of other nerves. The treatment recommended by the author is intended to direct the current of blood toward the skin, so as to relieve the abdominal organs. It consists in enveloping the entire body in moist clothes, according to the method of Priessnitz, so as to diminish the body-heat. The process should be repeated every two or three hours. Cold wrappings act as nerve-excitants and favor circulation and respiration. Warm wrappings act as derivatives and regulate the circulation. Should there be phenomena of collapse, mustard-baths at a temperature of 35° to 40° C. (95° to 104° F.) for ten or fifteen minutes are indicated. In addition one may give 10 or 12 drops of cognac or rich wine,

or tea with cognac. To allay the vomiting and diarrhoea, opium may be given if the heart is sufficiently strong to warrant it.

DISEASE OF THE LIVER.

The great size of the liver and the all-important relation which it bears to the circulation during foetal life doubtless explains the great frequency of the disease in newborn children, which is more or less directly traceable to disturbance in the liver. Kehrer has stated that severe icterus neonatorum may be observed as early as the second or third day of life. Baginsky observed that the first discoloration was on the face and breast, the abdomen, extremities and eyes being subsequently affected. He also noticed a fact that bears in this direction, namely, that the red corpuscles, which number from six to seven millions per cubic centimetre on the first day of life, number only four to five millions on the fourth or fifth day. Hofmeier found the red corpuscles in the blood of the newborn more spherical than those in adults, that they show no tendency to form rouleaux; also that they are viscid, deliquescent, and easily destroyed. Currier⁵¹ draws a distinction between cases of icterus due to excess of hæmoglobin in the blood, those which are due to resorption of the bile, and those which result from septic condition. Scott⁵¹ narrates a case of fatal hæmorrhage associated with jaundice in a child 7 days old, and in addition advances a theory of icterus neonatorum. The child was apparently healthy when born, but when the stump of the umbilical cord dropped off, on the fourth day, there was free bleeding from the umbilicus. There were also ecchymoses over the shoulders, spinous processes, ilium, and other places. On the following day there was jaundice. The bleeding continued at intervals, and death took place on the seventh day.

The foetal circulation must stop with the separation of the placenta or the tying of the cord. This must induce more or less congestion of the liver, with temporary and slight retardation of the circulation. In other words, the circulation in the newborn infant partakes of the nature of the circulation in the foetus as well as of that in the adult. The duration and severity of the passive congestion of the liver will vary with the strength of the child and its capacity for respiration, but in very many cases the intensity is sufficient to result in that most common condition, icterus neona-

torum. The icterus and the passive congestion disappear as the circulation becomes normal. Should there be heart failure in conjunction with passive congestion of the liver, more or less disorganization of the latter organ will occur. Bile and waste matters will accumulate in the blood, the capillary walls will be weakened, and effusions of blood will take place into the skin, mucous membrane, etc.

Cases of intense icterus neonatorum are reported by Stryker, of the Philadelphia Hospital, ⁷⁶⁰_{May 28} and Hinkson, ¹_{Aug. 24} in one of which an extravasated mass of blood pressing upon the duodenum and bile-duct seemed to furnish an explanation for the jaundice. Stryker suggests the use of a laxative (sweet-oil) in cases in which there is no diminution in the intensity of the discoloration after several days.

Another theory for the origin of icterus is advanced by Newmann, ¹⁵⁸_{xii. 2. 1} who had observed for some time that the biliary coloring matter of the blood in newborn infants with icterus appears at times in the tissues in a granular or crystalline form. It may be very readily found in the greater omentum. He has also found bilirubin in the fat-cells of the omentum of a newborn infant who, while living, had no icterus, and in a number of infants who died during or immediately after birth. This fact was noted in 8 out of 12 cases which were studied. He, therefore, thinks that in many infants, in other respects normal, there is in solution in the blood a sufficient quantity of biliary coloring matter to produce decided jaundice, and that after death this crystallizes out into the fatty tissues. Chemical proof of the existence of biliary coloring matter in the blood of the newborn is as yet wanting. It may be that in icterus neonatorum there is an increase within physiological limits of certain processes of foetal life.

THERAPEUTIC AGENTS.

Among recently-introduced therapeutic agents, creolin has commanded its fair share of attention. Of antiseptics, surely there is no end, but the list of those which are safe and efficient is not large. In the opinion of more than one writer, creolin is to be added to this list. Garrigues in particular has commended it for use in the parturient chamber. Schwinz ¹¹⁸_{Aug. 4} finds it very useful in various diseases of the newborn and young infants. In ophthalmology

blenorrhœa he used a 1-per-cent. irrigating solution, and in four-fifths of the cases there was no apparent change for the better. In 11 cases of thrush and aphthæ complete cure was produced in five to seven days by washing out the mouth and pharynx with 1-per-cent. solution. The chlorate or permanganate of potash, boric acid, etc., had previously been used to no purpose. In 4 cases it was used for omphalitis, the navel and its surroundings being rubbed with pure creolin. Cure always resulted within four days. In 4 cases of acute erysipelas in the newborn, commencing at the navel-stump, the pure creolin was rubbed in twice daily. No poisoning resulted, and in five or six days all the cases were nearly well. In 9 cases of acute gastro-enteritis it was used internally in the following formula :—

R Creolini,	0.125 to 0.2 gramme (Mii-iiij).
Aq. cinnamomi,	80.0 grammes (f ʒiiss).
Syr. althææ,	20.0 grammes (f ʒv).

Sig. : A teaspoonful every hour.

This treatment was usually successful, the disease yielding in three to six days. Occasionally vomiting was one of the unpleasant results of its administration. In the surgery of the newborn, creolin is inestimable as an antiseptic, especially in those cases in which sublimate or carbolic acid cannot be used. A 1½- or 1-per-cent. solution will suffice for the disinfection of the operation-field, wounds and cavities, and neither erythema nor eczema upon the skin will result.

MEDICO-LEGAL.

The test of vitality in newborn infants who have died during or very soon after birth, as recommended by Rayger in 1670, consisted in the capability of the lung to float in water, this crude and imperfect testimony that air had entered the pulmonary alveoli being accepted as legal evidence of quick birth for two hundred years. Quite recently Brestan has proposed to substitute in its place the capability of floating of the stomach and intestines as surer testimony to the same end. Bernheim⁶⁹ denies the utility of any such tests if they are supposed to represent anything with scientific accuracy. He suggests, instead, that the specific gravity of the lung-tissue be ascertained, and this can be done without great expenditure of time and with mathematical exactness, the tissue being immersed in a specially-arranged specific-gravity flask. He has tested his method

in a great many cases, and has found that a lung in which respiration has taken place, even for the shortest time, will be represented on the scale by at least 0.8. The foetal lung, which sinks in water, and has consequently a higher specific gravity than water, would be represented by 1.1, being similar to the specific gravity of liver and muscle tissue, the former of which is 1.147 and the latter 1.15. If there is partial atelectasis of the lungs, such portions must be thoroughly removed before applying the test. The figures 0.8 and 1.1 may be taken as constants for the representation of living and dead-born children. Of medico-legal interest, also, is the recent arrangement in the Prussian civil code of the limitations of intra-uterine life during which a foetus has legal rights. This is termed the "epoch of conception," and its limits are fixed at 180 and 300 days. Under the lower limit a foetus is not supposed to be viable, and above the upper limit a child may, under certain circumstances, be pronounced illegitimate. Olshausen, in a very just and temperate paper before the Berlin Obstetrical and Gynæcological Society, criticises both these fixed points. If 180 days represent vitality in the case of the foetus in the sense of capacity for the respiratory function the period is too great, for a foetus may respire, at least for a few hours or minutes, when not more than 160 or 165 days old. On the other hand, 180 days is not a sufficiently long period in order that a foetus may have the capacity for independent and continued existence. At the other extreme, 300 days is far too short a period, Olshausen himself, Hohl, Ahlfeld, Matthews Duncan, and others, being abundantly able to demonstrate that the period of gestation may continue to 325 or even 335 days. In extra-uterine pregnancy it is generally admitted that life may persist many weeks after the normal period of gestation has ended.

DISEASES OF THE SKIN.

Exfoliative dermatitis in the newborn received little attention until it was described by Ritter in 1878. Since then it has been studied anew by Elliott.¹¹⁸ ⁵¹_{Oct. '91; May} There is first a dry and scaly condition of the skin, beginning with a redness in the lower half of the face. Soon the entire surface may take any shade between a pale red and an intense purple. Then follows exfoliation, perhaps without evidence of exudation, the underlying tissue being cov-

ered with a fine layer of new epidermis. Small vesicles may appear prior to the exfoliation, and in such cases the horny layer of the epidermis may be undermined by a liquid exudate. Regeneration follows exfoliation, the skin remaining irritable for some time. The disease lasts from seven to ten days, and in typical cases there is no fever. It may be fatal. Kaspary's theory of pathogenesis is probably correct, namely, that the disease is an epidermolysis of unknown nature, followed by secondary hyperæmia. It may be said to be an acute disorder of nutrition in the superficial layers of the skin which do not contain blood-vessels.

Erythema is a very common condition in the newborn, and is the subject of a recent contribution by Vineta-Bellaserra.⁶⁶⁵ ⁵¹ It is characterized by great numbers of vesicles with a red areola, and as these rupture they become fused. Healing may take place quickly under good hygienic surroundings with suitable alimentation, otherwise the reverse will take place. It is most frequently seen upon the nates and posterior surface of the thighs, but may also be present upon the trunk and head. It is one of the accompaniments of athrepsia. It may be mistaken for variola, syphilis, or erysipelas. Bland, absorbent powders should be used in its treatment, and if there is ulceration one may use applications of naphthaline, iodoform, or a 5-per-cent. solution of aseptol. The treatment of Di Lorenzo¹⁵⁸ ^{10, 11, 12} consists in carefully cleansing the skin with a 2-per-cent. solution of boric acid, applying a bland ointment to the entire diseased surface, and then covering the whole body with a compress of carbolyzed cotton, the anus and external genitals not being included therein.

Sclerema neonatorum is one of the curious and rare diseases of the earliest period of life. In a case reported by Baras,⁵¹ the eruption was limited to the nates and lower extremities. It had a dry and polished appearance, and firm pressure did not produce pitting. Half a grain (3 centigrammes) of gray powder was given night and morning for two months, and at the end of that period the induration had entirely disappeared. In the case reported by Angel Money⁵¹ ^{Sept.} there was a hard patch on the right shoulder and another on the left parotid region. The skin of the buttocks, shoulders, legs, and neck was also hardened. The treatment consisted in friction of the indurated portions with sweet-oil, a diet of fresh cows' milk and barley-water, and daily inunction of blue

ointment into the skin of the abdomen. In two months recovery was complete. Makenzie²⁶_{July} and Northrup⁵⁹_{Oct. 12} also report cases.

Another disease, by no means common among the newborn, is pemphigus, careful studies of which have been made by Olshausen and Mekus, Pulvermacher, Danek, Riegel, Zechmeister, and Gibier. Strelitz¹⁵⁸_{III, II, I} has studied the disease bacteriologically, obtaining cultures of cocci, of which an illustration is reproduced opposite page 4 (I, II), this section. Kilham²⁷_{Oct.} has also published a report of an epidemic of the disease which was recently seen at the New York Infirmary for Women and Children. Such epidemics have been very rare in this country. Nine children were infected, the disease appearing between the second and fourth days of life. That it was not syphilitic in character in this epidemic seems to be proven by the fact that there were no other signs of syphilis, and that the patients recovered without medication.

Very rarely does favus appear in the newborn. Desmet²⁴_{Aug. 4} reports a case occurring in an infant 15 days old, or, rather, the disease was discovered within the first few days after birth. In all 15 patches were discovered, and the diagnosis was verified with the microscope. The treatment consisted in the removal of the patches, the use of lotions of soap, and of white precipitate ointment.

HERNIA.

Patterson⁵¹_{July} classifies congenital diaphragmatic hernia into three varieties, according to the mode in which the hernial sac is formed: 1. In this class there is defective formation of the diaphragm. The rupture is usually unilateral. 2. The rupture may occur through one of the natural openings. 3. A very rare variety is that which is due to distention of the diaphragm. A case of the first variety is reported, the left half of the diaphragm being wanting, and the abdominal viscera being crowded into the thoracic cavity. The child lived only half an hour. In a case reported by Jacobus⁵⁰_{Nov. 28} there was a large external hernial sac containing the intestines and liver, the tumor protruding from the deficient left side of the abdominal wall. The wall of the hernial sac was composed of peritoneum and amnion, and was ruptured during delivery. Not only were the liver and intestines displaced, but also the stomach, spleen, left kidney, and fundus uteri.

The condition of open urachus is an important one and may

persist for years before the true state of affairs is discovered. Tait has seen urachal cysts of great size which were mistaken for ovarian tumors. In some of the cases there is an external opening with periodical discharge of urine from the vesico-urachal fistula which is thus constituted. Willard,⁹ proposes a simple operation for the closure of the duct.

Harries,⁹⁰ reports a case of hernia into the umbilical cord, the tumor being composed of both large and small intestines, as large as a chicken's egg, and easily reducible. The sac was opened soon after birth, the intestines released, and the opening closed with a double ligature of catgut. The umbilical cord and the sac were then removed half an inch (1.4 centimetres) from the navel. The result was satisfactory in all respects.

Strangulated inguinal hernia may occur in newborn infants, as is shown by the case of Robinson.⁵¹ In this case there had been no movement of the bowels for two days. Other symptoms were stercoraceous vomiting, collapse, aphthæ upon the mouth; and the abdomen was hard and tender. The hernia was in the right groin and not reducible even under chloroform. An operation resulted in complete cure. Barton,⁹ operated upon an umbilical hernia with success in which the patient was only 33 hours old. The entire subject of the treatment of congenital umbilical hernia at birth has been worked up by Lindfors,³¹⁷ and he has collected 13 cases of which 10 were operated upon and 3 treated expectantly. The record is an interesting one and is, in brief, as follows: 1. Felsenreich. Large sac extirpated seven hours after birth. Recovery. 2. Godlee. Operation delayed until fourteenth day. Adhesions. Death on third day. 3. Treves. 4. Olshausen. Operation three and a half hours after birth. Recovery. 5. Fleischmann. Hernia too extensive for plastic operation. Recovery with use of binder. 6. Caldwell. Operation; fæcal fistula, which finally closed. 7. Reuter. Operation; recovery. 8. Stolypinsky. Enormous hernia, too great for operation. Pressure bandage. Death in fourth week. 9. Robertson. Large hernia, bandage, death. 10. Piperno. Operation in cold hovel. Death on second day following. 11. Dunlap. Operation one hour after birth. Recovery. 12. Dohrn. Extra-peritoneal operation five hours after birth. Recovery. 13. Stolypinsky. Operation under chloroform an hour after birth. Recovery.

Doran,²⁵_{Aug. 20} in commenting on these cases, remarks that these statistics show that the newborn infant bears abdominal section very well. Indeed, cutting seems less dangerous than cold. The operation may be done without an anæsthetic, or an anæsthetic may be given as early as one hour after birth. Of the 10 patients which were operated upon, only 3 were fatal. Doran's conclusion is that congenital umbilical hernia may be operated upon as soon as possible after birth, unless the hernia is very large or the deficiency of the parietes great. Doran⁵¹_{Sept.} also writes concerning ovarian tumors in the newborn, he having found two in an infant which lived only a few minutes. This must be considered an important contribution to the pathology of the pelvic organs. The abdomen was distended and the superficial veins were enlarged. Each tumor had a single cystic cavity, and its thin wall was traversed in all directions by trabeculæ which were composed of round cells in a transparent matrix. The growth represented persistence and hyperplasia of the entire embryonic tissue of the parenchyma of the ovary. In the substance of the tumors were Graafian follicles, but the former were of extra-follicular origin. The cavities and large central cyst were apparently the result of breaking down of the tumor-substance. The tumors bore no resemblance to the common multilocular ovarian cyst.

The question must arise not infrequently whether certain deformities and disfigurements commonly considered as due to faults of development may not be attributed, at least sometimes, to severe or protracted labor, to the unskillful use of instruments during parturition, etc. Such a suggestion has been raised by Batchelor⁵¹_{Sept.} in connection with a case of meningocele, the vertex presenting with an occipito-posterior position. Did the forceps press out some of the contents of the skull at a point where there was little resistance? This subject will bear considerable investigation.

Vincent⁵¹_{May.} was able to obtain an excellent specimen representing obstruction of a portion of the œsophagus and fistulous communication between the œsophagus and trachea. The child lived seven days and was entirely unable to take and retain any nourishment. The same author has reported five cases of imperforate anus which were all treated successfully, an artificial anus being formed with the end of the rectum. The opening was in some cases as high as the third or fourth sacral vertebra, but this was considered far preferable to colotomy.

DIETETICS OF INFANCY AND CHILDHOOD.

By LOUIS STARR, M.D.,

AND

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PHILADELPHIA.

INFANT FOODS.

Albert R. Leeds ¹⁰⁶⁷ gives a series of valuable analyses, which we consider the best work accomplished on this subject during the past year; hence we quote him almost verbatim.

Malt-Extracts.—Of these Leeds examined the following:—

1. Dry extract of malt, experimentally prepared. This is a white powder, with the taste of malt-sugar.

2. Dry extract of malt, experimentally made, another preparation similar in appearance and taste to the foregoing.

3. Maltine, manufactured by the Maltine Manufacturing Company, of New York. This is a yellow syrup, with a sweet, malt-like taste. It is stated on the label to be a “concentrated extract of malted barley, malted wheat, and malted oats, and contains all the digestive and nutritious principles of these three important cereals, with but slight residue. One bottle of maltine is equal (in diastasic power) to from three to four bottles of any other extract of malt in the market. Maltine, in nutritive value, far exceeds any other extract of malt or any preparation of malt made from barley.”

The writer does not find any statement of the composition of maltine by the manufacturers. According to three determinations made by him, it contains 68.03 per cent. of malt-sugar. This is its largest constituent, though, of course, the active principle of malt is the most important. In taste and physical appearance the sample of maltine which he tested had not apparently altered, neither had it shown any indications of fermentation, though the bottle had been open from time to time and had been kept in a half-filled condition over the great heats of the past summer. In these particulars

(M-1)

it is a great improvement upon a very thick, extremely sweet maltine syrup which he purchased in former years, and which fermented and wasted by frothing out of the bottle. A determination of the diastatic action gave 1.261 grammes ($19\frac{1}{2}$ grains) of maltose formed, when 0.25 gramme (3.8 grains) of the maltine was allowed to act upon 6 grammes (92 grains) of starch. When 0.15 gramme ($2\frac{1}{2}$ grains) of maltine acted upon the same weight of starch, 0.737 gramme ($11\frac{1}{2}$ grains) of maltose was formed; and when 0.10 gramme ($1\frac{1}{2}$ grains) of maltine was used, 0.558 gramme ($8\frac{1}{2}$ grains) of maltose was produced. These results give for the co-efficients of diastatic energy (or the amounts of converted starch per unit of maltine used), 5.04 grammes ($77\frac{1}{2}$ grains) in the first trial, 4.91 grammes (75 grains) in the second, and 5.58 grammes (86 grains) in the third. In all his experiments the maltose produced was determined gravimetrically upon the cuprous oxide precipitated by boiling for twelve minutes in presence of excess of Fehling's solution. The conversion was effected by heating for half an hour at 55° C. (131° F.) in the presence of a perfectly neutral arrow-root starch-jelly. It will be interesting to know whether the energy of the diastase diminishes on keeping, and at some future time he proposes to determine this anew upon this same sample.

4. Trommer's extract of malt with hops. This is stated to consist of the soluble constituents of the best Canada malt. It is of a thick, brownish-yellow color and with an aromatic malt-sugar taste. According to the published analysis of L. R. Fresenius, the specific gravity of the extract at 20° is 1.39, and its composition is:—

Malt-sugar,	51.03
Dextrin (inclusive of other non-nitrogenous substances),	10.94
Albuminoids,	3.11
Glycerin,	9.37
Free acid, calculated as lactic acid,	0.48
Alcohol,	1.59
Inorganic substances,	1.16
Water,	22.47

In the sample which Leeds analyzed there was 66.14 per cent. of malt-sugar. Some samples of Trommer's extract, which he had in former years, went into active fermentation, and much of the contents of the bottles frothed over and was lost. The present sample he kept for six months, and in taste and physical characters

it is apparently unchanged. Fresenius states that this extract has great diastasic power, but his analysis contains no determination of its amount. This omission is unfortunate, inasmuch as the other data of the analysis are comparatively unimportant. Leeds made four determinations, acting on, progressively, smaller amounts of starch. In the first, in which 0.25 gramme ($3\frac{1}{4}$ grains) of the extract was allowed to act on 6 grammes ($92\frac{1}{4}$ grains) of starch, the starch, to the eye, was apparently unaltered, no perceptible liquefaction occurring. A gravimetric determination, however, showed that 0.007 gramme ($\frac{1}{16}$ grain) of maltose had been formed. An improvement over this very low figure was obtained when the amount of starch to be acted upon was reduced to one-sixth of the above amount, the same weight of extract being used. Under these conditions 0.052 gramme ($\frac{1}{2}$ grain) of maltose was formed. The amount of conversion of the starch, per unit of extract used, was in the first trial 0.028 of 1 per cent. and in the second trial 0.208 per cent. The diastasic action of the sample of extract he tested is therefore practically *nil*. The amount of maltose formed per unit of extract used is what is important to consider, rather than the amount formed as compared with the weight of starch taken. This, of course, with the same absolute amount of diastasic action, will apparently increase as this energy is allowed to exert itself upon smaller and smaller amounts of starch.

5. Merck's dry extract of malt. This is a dry powder, very hygroscopic, and becoming liquid in contact with moist air. It has the taste of malt-sugar. In fact, it consists almost entirely of this substance, a determination of the quantity of malt-sugar showing 75 per cent. Merck's extract has no diastasic action whatsoever upon starch.

6. Malted milk-powder. The composition of this powder is given in another place. It has no converting action on starch.

7. Johann Hoff's malt-extract. This has a dark, reddish-brown color, with a flat, faintly-sweet taste. It has no diastasic action upon starch. It contains no alcohol, and has 9.316 per cent. of extractive matters.

8. The "Best" tonic. This is stated to be a concentrated liquid extract of malt and hops, manufactured by Ph. Best Brewing Co., Milwaukee, Wis. It is a dark, reddish-brown liquid, of an aromatic taste and sweetish, aromatic smell, and is rendered

lively by the presence of much dissolved carbonic acid, due to fermentation after bottling. It contains 1.25 per cent. of alcohol and 9.182 per cent. of extractive matters. It effects no liquefying or digestive influence upon starch, having no diastasic property. Both the Hoff malt-extract and the "Best" tonic may possess nutritive qualities, but they are valueless as aids in digestion of starch.

The following table gives the analytical data upon which the above statements are based:—

TABLE OF DIASTASIC ACTION.

	Grammes of Starch Used.	Five per Cent. Sol. of Extract in Cub. Centim.	Weight of Ex- tract in Cubic Centim. Taken.	Maltose Found in Grammes.	Maltose in Ex- tract Used.	Maltose Derived from Starch.	Conversion per Cubic Centim. in Grammes.	Conversion per Unit of Ex- tract Used.	Maltose per One Hundred Parts of Starch.
	Grms.	C. Cent.	Grms.						
DRY EXTRACT OF MALT, No. 1, containing 68.41 per cent. of maltose . . }	{ 6.0 6.0	5.0 5.0	0.25 0.25	3.422 3.371	0.208 0.208	3.214 3.168	0.643 0.632	12.85 12.64	57.08 56.20
DRY EXTRACT OF MALT, No. 2, containing 82.77 per cent. of maltose . . }	{ 6.0 6.0	5.0 5.0	0.25 0.25	3.824 3.806	0.207 0.207	3.117 3.099	0.623 0.620	12.46 12.40	55.40 55.11
"MALTINE" (syrup), con- taining 68.06 per cent. of maltose }	{ 6.0 6.0 6.0	5.0 3.0 2.0	0.25 0.15 0.10	1.481 0.839 0.626	0.170 0.102 0.068	1.261 0.737 0.558	0.252 0.246 0.279	5.04 4.91 5.58	28.80 13.98 10.43
TROMMER'S EXTRACT OF MALT, containing 66.14 per cent. of maltose . . }	{ 6.0 1.0 1.0 0.5	5.0 5.0 3.0 5.0	0.25 0.25 0.15 0.25	0.172 0.217 0.118 .	0.165 0.165 0.099 0.165	0.007 0.052 0.019 None.	0.0014 0.0104 0.0063 None.	0.028 0.208 0.127 None.	2.87 21.73 11.77 None.
MERCK'S DRY EXTRACT OF MALT, containing 75 per cent. of maltose . . }	{ 6.0 1.0 0.5	5.0 5.0 5.0	0.25 0.25 0.25	. . . . . . . . . . . .	0.187 0.187 0.187	" " "	" " "	" " "	" " "
MALTED MILK-POWDER.	{ 6.0 1.0 0.5	5.0 5.0 5.0	0.25 0.25 0.25	. . . . . . . . . . . .	0.125 0.125 0.125	" " "	" " "	" " "	" " "

Franco-Swiss Milk Food.—This is a very finely powdered, dry wheat-meal. It has an agreeable flavor, resembling cake. This flavor is due partly to the milk solids and fats, partly to the processes of preparing the cracker before pulverizing, whereby the raw taste of unbaked flour is gotten rid of, and, in part, to added sugar. It appears to keep quite dry and unaltered in the tin cans in which it is sold. On addition of water nearly half the food goes into solution, the dissolved portion being mainly sugar, with a little soluble starch. Fully a third remains undissolved, being insoluble starch. The casein of the milk, condensed along with the dry cracker-meal, is also insoluble, and remains suspended in the fluid as separate, hard particles. The properties of the casein

are not altered in the process of condensing and mixing with the flour, and in its dry, hardened condition it is difficult of digestion by infants.

COMPOSITION.

Water,	4.16 per cent.
Fats,	1.94 "
Milk-sugar and grape-sugar,	9.70 "
Cane-sugar,	34.62 "
Starch,	33.02 "
Soluble carbohydrates,	46.85 "
Ash,	1.43 "

Loefflund's Cream-Emulsion.—This is a thick, brown paste, with the unctuous consistence and the smell and taste of the candy called butter-taffy. It is stated to be made of best Bavarian mountain milk, together with malted wheat-extract. The advertisement further mentions that the milk has had no portion of its cream removed, that no cane-sugar is added, and that the flour has been so thoroughly changed by diastase that only soluble carbohydrates, in the nature of maltose and dextrin, are left, the starch having disappeared. These statements, Leeds thinks, are true; and, what is unusual in regard to proprietary foods, his analysis of the emulsion agrees reasonably well with that put forward by the manufacturers. They say that it contains 6 to 7 per cent. of milk-fat, 33 to 36 per cent. of carbohydrates (malt-sugar, milk-sugar, dextrin), 7 to 8 per cent. casein and nitrogenous substances of the grain.

Leeds obtained, by analysis of the contents of a can which he bought at a neighboring pharmacist's:—

Water,	24.32 per cent.
Fats,	15.32 "
Soluble albuminoids,	8.24 "
Insoluble albuminoids,	4.99 "
Maltose and lactose,	43.16 "
Dextrin,	6.27 "
Ash,	2.60 "

It will be seen that the advertisement claims only 6 to 7 per cent. of fat, while in the sample which he analyzed there is 15.32 per cent. And, inasmuch as this is almost entirely milk-fat, a very little coming from the grain, it renders the statement eminently probable that rich milk, from which none of the cream has been abstracted, is used in making the emulsion. The author has used

the term *emulsion*, inasmuch as this is the name given by the manufacturers. But it is not fairly applicable to a mixture of condensed milk and maltose.

The percentage of fat is very large, and he thinks that the discrepancy, which in this instance is in favor of the manufacturer, is due to the failure of the customary method of determining the percentage of fat when applied to this particular food. It is usual, after getting rid of the water by evaporation, to extract the fat from the residue by long-continued percolation with anhydrous ether. But when this cream-emulsion is dried the sugar and other substances coat over and inclose the particles of fat so that no thorough extraction of the fat is possible. By the use of the usual method the percentage of fat was found to be 7.401. This method being fallacious, he substituted the following: The emulsion was diluted and precipitated, the fat along with the albuminoids, etc., by means of cupric hydrate. The precipitate was then dried, and the fat extracted in precisely the same manner as in the analysis of milk. This gave the true percentage, which is 15.32.

It is stated that the emulsion dissolves readily in water, the fatty substances producing a uniform mixture like fresh milk. This is not the case. A brownish-yellow liquid is formed, from which white curds separate and float to the top (casein and fat), and which has the smell and taste of malt-sugar. The liquid is much too sweet to resemble cows' milk, and the presence of so large an excess of saccharine matters is highly objectionable.

Wells & Richardson's Lactated Food.—The name of this food gives a false idea of its nature and properties. According to the definition of lactate, a *lactated* food would be one which contains *milk*. But this food contains no milk. Foods prepared by the method originally proposed by H. Nestlé, of Vevey, in Switzerland (the thorough mixture of condensed milk with specially-prepared and finely-pulverized baked flour), could properly be called lactated foods.

The milk foods of Nestlé, the Anglo-Swiss, the Franco-Swiss, and the American-Swiss are lactated foods, whilst that of Wells & Richardson Company is not. These true lactated foods are much better adapted to the nutrition of infants than the so-called lactated food under consideration, as may be seen by a comparison of their relative composition:—

	American-Swiss Milk Food.	Wells & Richardson's Lactated Food.
Water.	5.68	7.76
Fat	6.81	1.64
Milk-sugar.	5.78	29.64
Cane-sugar	36.43	
Soluble carbohydrates	45.85	39.00
Starch.	30.85	36.43
Albuminoids	10.54	11.85
Ash.	1.21	2.61

It is evident that the milk food, being truly lactated, is rich in fats; the other is poor. The milk-sugar of the milk food is derived from the milk; that of the lactated food is artificially added. In the former there is 36.43 per cent. of cane-sugar derived from the condensed milk employed, this cane-sugar being a disadvantage. More than a third of the lactated is starch, which is indigestible by infants, and its albuminoids are derived from the gluten, etc., of the cereal. In the milk food they are largely made up of the albuminoids of milk itself. But the above analysis of lactated food can be studied most advantageously in connection with the astounding and erroneous analysis put forward by the manufacturers of this food, and with the equally erroneous statements made by them in connection therewith:—

	LACTATED FOOD.	
	As Advertised.	As Analyzed.
Water. . . . .	. . .	7.76
Fat . . . . .	. . .	1.64
Milk-sugar.	25.00	29.65
Malto-diastrase	15.00	
Soluble carbohydrates	41.67	39.00
Starch. . . . .	. . .	36.43
Gluten and soluble albuminoids	16.35	
Albuminoids. . . . .	. . .	11.85
Potassium bicarbonate	1.25	
Phosphates . . . . .	.25	
Sodium chloride and other salts . . . . .	.48	
Ash . . . . .	. . .	2.61
	100.00	

It is stated that the lactated food contains no less than 15 per cent. of malt-diastrase, and that this quantity has been obtained from the finest quality of barley-malt without the aid of heat;

furthermore, that this amount of malt-diastase retains its full diastasic value. As a matter of fact, the diastase exerts no diastasic action on starch when the food is brought into solution. The lactated food is a dry powder, with none of the pleasant cake-like taste of the Nestlé's, the Franco-Swiss, Anglo-Swiss, and other truly lactated foods. On the contrary, it has an alkaline taste from the large amount of bicarbonate of potash which is present in it. In the presence of so large an excess of alkali no diastasic action would be expected to take place, and, in fact, none occurs.

The analysis published by the manufacturers shows *no starch*, while there is really present 36.43 per cent. And another odd statement is that milk-sugar is a soluble carbohydrate, and if its amount be subtracted from the soluble carbohydrates the analysis published by them foots up to 75 per cent., leaving a deficiency of 25 per cent. to be accounted for. Is it not true that, besides the "soluble" carbohydrates, the food contains insoluble carbohydrates? Do not these consist almost entirely of unchanged starch?

There is no diastasic action when the food is dissolved in warm water; the insoluble starch is not rendered soluble, neither is any soluble dextrin or maltose formed. The food was suspended in water which was kept at 55° C. (131° F.), the temperature most favorable to diastasic action. None of the starch contained in the food itself was converted into maltose under these circumstances, nor did the lactated food bring about any conversion in a fresh portion of starch, however long the action was continued, or however large a portion of the lactated food was employed.

Malted Milk.—This is a milk food, but it differs from Nestlé's and others of this class in a number of important particulars. The most important of these is that the starch of the wheat has been mostly converted into maltose by the diastase of malt. The malt-extract remaining in the food, as sold, has no diastasic virtue. On dissolving this food in water, the most careful tests did not reveal the slightest change brought about thereby in a fresh portion of starch. The claim which is set forth by the manufacturers, that under the influence of the malt-diastase the casein of the added milk has been predigested, by which is understood that they intend

to say that it has been converted into a soluble form, is erroneous. The casein in the "malted milk" is present with its properties no more changed than they are in Nestlé's, the Anglo-Swiss, or analogous milk foods, or other similar milk foods, prepared by evaporating down baked-wheat powder with condensed milk. In all of these it is left behind as separate, hard, unchanged particles of casein. Composition of malted milk:—

Water,	2.18
Fat,	5.30
Albuminoids,	16.88
Soluble carbohydrates,	66.99
Starch,	5.57
Malt-sugar and milk-sugar,	50.40
Ash,	8.13

Boiled Flour.—At the request of J. Lewis Smith, Leeds made analyses of some wheat-flour in its original condition, and also after a portion of this flour had been subjected to prolonged boiling. Smith himself prepared the boiled flour, which was contained in a bag, and boiling for five days, fifteen hours a day, or seventy-five hours in all, the bag being taken out over night. The original flour is white; the boiled flour, after thorough drying and pulverizing, is of a light-yellow color. The boiled flour is remarkably flat and insipid,—much more so than flour which has been baked. The long-continued boiling dissolves out and carries into solution all of the fat, some of the soluble carbohydrates and the soluble albuminoids, and the residue has correspondingly little flavor. The nature and significance of the change effected by boiling can best be seen by comparison of the analyses themselves, as follows:—

	Original Flour.	Same Boiled.
Water	9.546	10.550
Soluble albuminoids	0.382	
Insoluble albuminoids	10.898	
Total albuminoids	11.280	10.520
Starch	71.924	72.362
Cellulose.	0.560	0.560
Gum	0.275	0.468
Fat	0.766	
Yellow coloring matter		0.041
Soluble carbohydrates (not including fat)	5.120	5.178
Total carbohydrates (not including fat)	77.879	78.568
Ash	0.506	0.420

After two hours' digestion of 2.43 grammes (37.5 grains) of the dried flour with anhydrous ether he obtained no fat, but in its place 1 milligramme ($\frac{1}{84}$ grain) of a yellow coloring matter. Apparently, this had been formed in the process of boiling, and to it the color of the boiled flour is due.

Matzoon.—This is fermented milk, stated to be in extensive use among the natives of Asia Minor, and prepared and introduced into this country by Markar G. Dadinian. The records of clinical experience, relating to its use by invalids in cases of severe gastric disorders, general debility, etc., are too meagre to permit of forming any opinion upon its merits in these connections. It has also been proposed as infant food, but the following analysis shows it to be ill suited for such use. By comparison with the subjoined analysis of average cows' milk, it will be seen that the change effected by fermentation is a disadvantageous one. The milk-sugar is much diminished, being converted into lactic acid, alcohol, and other products of fermentation. If the casein were changed at the same time and rendered soluble, a more favorable opinion might be formed, but such change does not occur. It is left behind in large insoluble curds:—

	Cows' Milk (Average).	Matzoon.
Water	87.41	87.63
Total solids	12.59	12.38
Fat	3.66	3.49
Milk-sugar	4.93	3.68
Albuminoids	3.78	3.48
Ash	0.70	0.697
Lactic acid . . . . .	. .	0.90
Alcohol and other products of fermentation .	. .	0.13

Murdock's Liquid Food.—This is stated to be an extract of beef, mutton, and fruits, and to contain 12½ per cent. of soluble albumen. The preparation has a peculiar taste and smell, which are not those of meat-extract alone. It is of a reddish color, with a somewhat muddy, turbid appearance, due to suspended matter. Under the microscope the blood-corpuscles and other matters of animal and vegetable origin appear to have undergone such changes and to have become so broken down in the various processes of manufacture of the food that they are unrecognizable.

The results of two partial analyses are as follow:—

	I.	II.	Mean.
Water	84.8 5	84.41	84.623
Total solids	15.165	15.59	15.377
Ash	0.672	0.701	0.686
Phosphoric acid	0.081		
Albuminoids	14.837	14.926	14.622

The percentage of phosphoric acid, calculated not (as in the table) upon the whole food, but upon the solid matters in the food, is 0.530 per cent. It is 11.88 per cent. of the ash.

Careful search was made for glycerin, boracic acid, salicylic acid, and alcohol, but the presence of these bodies was not detected, nor does the writer know what preservative, if any, is employed.

Valentine's Meat-Juice.—This is a clear, reddish-brown liquid of a nearly saline smell and taste. A partial analysis afforded:—

	I.	II.	Mean.
Water	58.12	57.89	58.01
Total solids	41.88	42.11	41.99
Ash	12.55	12.66	12.605
Phosphoric acid	8.658		
Albuminoids . . . . .	. . .	. . .	17.705

The percentage of phosphoric acid, calculated upon the total solids, is 8.709 per cent., and calculated upon the ash it is 29.02 per cent. The saline taste and the large amount of ash and total solids made it interesting to determine how much common salt, or chloride of sodium, the meat-juice contains. An analysis showed 4.848 per cent. of common salt in the food itself, or 38.48 per cent. of the ash. The palatability imparted by the saline matters and by the large percentage of meat-extractive renders this food grateful to a person suffering from the extreme prostration of sea-sickness. The Murdock liquid food and bovine are somewhat nauseating from their suggesting, in taste and odor, stale blood; but the Valentine meat-juice suggests rather a concentrated preparation of the extractive matters which impart to meat its flavor and appetizing qualities. Whether the large amount of phosphates and common salt is due to the addition of these substances in the process of manufacture Leeds does not know.

ARTIFICIAL FEEDING.

H. E. Stockbridge¹⁹¹ reports the following case of interest which occurred in his practice: Both mother and child were apparently in perfect health, with the single exception that the food of the latter was evidently imperfectly digested, casein-like particles being voided with the bowel excrement. No evidences of an abnormal condition of either child or mother were detectable, and the only food of the infant was its mother's milk. The author made a careful analysis of the milk; the actual cause of the difficulty was at once made clear, which is forcibly illustrated by the accompanying results, with the average composition of normal human milk:—

	Total Solids.	Casein.	Albumen.	Fat.	Milk-Sugar.	Ash.	Nutritive Ratio.
Milk examined . }	1.105 p.ct.	.49 p.ct.	1.44 p.ct.	1.56 p.ct.	6.91 p.ct.	.40 p.ct.	1 to 3.57
Normal mothers' milk . . }	1.298 p.ct.	.59 p.ct.	1.23 p.ct.	3.94 p.ct.	6.23 p.ct.	.45 p.ct.	1 to 6.81

The results of analysis showed no peculiarity of composition beyond the limits of normal variation, except in the single constituent of fat, and the milk, therefore, though not seriously deficient in nutriment, possessed a nutritive ratio of 1 to 3.57, most closely resembling cows' milk in this respect.

The abnormal results of the consumption of this food by an infant are perfectly apparent. The material consumed resembled, in physiological action, undiluted cows' milk, producing corresponding results and failing to be perfectly assimilated. The cause of the difficulty being thus determined, the remedy was self-suggested. By an abnormally low amount of fat, the ratio between protein and carbonaceous matter was reduced below the point of possible perfect assimilation. The rational correction of the diet was the immediate artificial supply of sufficient carbonaceous matter with each meal to constitute a normal nutritive ratio, that digestion might resume its functions under natural conditions. The material resorted to by the author for this purpose was lactose, about two grains (13 centigrammes) per feeding being estimated to preserve the proper ratio between the protein and carbonaceous

nutriment in the quantity of milk taken at a nursing. The results of this artificial chemical modification in diet are made forcibly apparent by the table of weekly weighings of the child for intervals of six weeks before and six weeks after the correction in diet:—

WEIGHTS BEFORE CHANGE IN DIET.			WEIGHTS AFTER CHANGE IN DIET.		
Weight.	Loss.	Gain.	Weight.	Loss.	Gain.
8 lbs.			9 lbs. 10 oz.	0	
8 "			10 " 6 "	0	12 oz.
8 " 1 oz.		1 oz.	10 " 10 "	0	4 "
7 " 14 "	8 oz.		10 " 15 "	0	5 "
8 "		1 "	11 " 4 "	0	5 "
8 " 1 "		1 "	11 " 11 "	0	7 "

From the above table it is plainly shown that for the six weeks previous to the change in diet there had been a total increase in the weight of the infant of but 1 ounce (31 grammes), while the average weekly increase after the artificial supply of carbohydrates began was 6.2 ounces (192.8 grammes) per week, with a total gain for the entire period of 2 pounds 1 ounce (1 kilogramme). No other change was made in the treatment of the child, and no change whatever was allowed in the diet of the mother, which had constantly been of the best. The marked and immediate improvement of the child could have been due to no cause but the artificial preservation of a normal nutritive ratio,—a truth further illustrated by the fact that all evidence of imperfect digestion, in the way of evacuated curds, vanished with the change in diet.

C. Rüger ¹⁸⁹_{Nov. 11, '99} ²⁵_{Mar.} treats very fully of the various substitutes for mothers' milk. Referring to the choice of a wet-nurse, he gives, as the result of numerous original analyses, that the milk of placid and otherwise healthy women, with copious secretion, is richest in the solids, not fat, while that of women of greater activity and vivacity is, though less abundant, richer in fat. Treating next of cows' milk, he insists on the fact that the essential difference between its composition and that of human milk consists not so much in the relative proportions of the casein, sugar, and fat as in the character of the casein itself, which, in the latter, forms in the stomach a soft, loose, flocculent coagulum, but in the former a solid, dense mass of the consistence of cream-cheese, and consequently far less digestible. The writer exposes the fallacy of the popular

preference for "milk from one cow," a course which involves the maximum of variability; whereas, when the milk of many cows is mixed, the product is as nearly uniform as possible. He condemns all so-called "foods," i.e., farinaceous substitutes for milk, since starch, as such, is not converted into sugar in the infant's alimentary canal; but he considers Nestlé's milk food (so widely advertised and praised) one of the worst of the preparations. In this condemnation he is supported by Kehrer, Henoch, Escherich, Wolf, Biedert, and another great authority in diseases of children, Ad. Baginsky. He does not mention Mellin's food, which is most valuable, but he gives the first place to those of Löfflund and Lieke and the *rhamgemange* of Biedert. In Biedert's he says the proportion between the nitrogenous and non-nitrogenous constituents most nearly approximate that of human milk.

Escherich⁸⁴_{Nov. 12, 14} believes the usual methods of artificial feeding for infants defective, owing to the great stress laid upon the percentage of nourishment contained in a given mixture, to the neglect of the actual amount of nourishment obtained by the child. As a basis of computation, he takes an estimate of the average weight at birth at between 7 and 8 pounds (3.4 kilogrammes); he tabulates the normal gain during the first year, and calculates the amount of nourishment appropriate for each increment. Beginning with eight meals in twenty-four hours, of 1½ ounces (46.6 grammes) each, the child receives six meals at nine months, each 6 ounces (186.6 grammes); at ten months a mixed diet, embracing solids, is allowed. The mixture which the author prefers is sterilized cows' milk; to each 4 ounces (118 cubic centimetres) a teaspoonful of malt-extract is added, because malt is less liable to cause fermentation than milk- or cane- sugar. This is diluted with sterilized water in progressively diminished quantities; he supplies fat by adding to the water a preparation of almond-meal, 1 teaspoonful to 4 ounces (118 cubic centimetres) of water. He believes that the usual methods of feeding result in the ingestion of much more food than is assimilated.

Boiled Milk.—It is now very regularly recognized,²_{Oct. 13} both by medical men and by the more highly educated section of the community, that it is a wise precaution to boil water and milk before using them as beverages, and the practice is becoming very common. The growth of pathogenic organisms in these fluids, espe-

cially in milk, is often very rapid, and thus diseases may be transmitted from one place to another. The temperature of boiling water puts an end to the life of the microbes and also to the danger of infection. Another reason why boiled milk is so much used, especially in infant feeding, is that it is supposed to be more easily digestible than fresh milk. If, however, we can draw correct deductions from dogs to babies, it would now appear that this belief in the superior digestibility of boiled milk is incorrect. Raudnitz, of Prague,⁸⁸ has recently published certain very striking experiments on this subject. He admits what any one may confirm for himself, that milk that has been boiled does not, on cooling and the subsequent addition of rennet, form a large, coherent clot, as does fresh milk, but a flocculent precipitate of casein is produced instead. He shows, however, by analyses of the milk itself and of the urine and fæces, that much less nitrogenous material is absorbed from milk that has been boiled than from the same milk when fresh. The digestibility of fat is apparently unaltered by boiling. The following figures, however, illustrate the fact just alluded to as to the difference of digestibility of the proteid materials. In three days 15.6 grammes ($\frac{1}{2}$ ounce) of nitrogen were given in the form of fresh milk ; of this quantity, 13.3 per cent. was found in the fæces and the nitrogen of the urine accounted for 77.3 per cent.; so that 9.4 per cent. was retained in store by the growing animal. The animal was next fed on boiled milk and 10.4 grammes (160 grains) of nitrogen was given in that form in two days ; 18.6 per cent. of this was found in the fæces and 75.7 in the urine ; so that only 5.7 per cent. was assimilated. The belief in the superior digestibility of boiled milk is, however, so wide-spread that we should like to hear of the confirmation of the above remarkable results before we recommend mothers to leave off what is, from other points of view, the very praiseworthy custom of boiling the milk they give to their children.

Asses' Milk.—In the Hospital for Infants' Diseases, Paris,¹⁰⁵⁸ there exists a section for sickly children. The administration of the hospital is arranged in two separate pavilions, where there is much ventilation, with large windows that look out upon a garden, and whose walls have double rows of willow-cradles perfectly equipped. The newly born receive here the personal care of the establishment, beginning with being weighed in the balance the

same day they make their appearance, the operation being frequently repeated—almost every month—in order to determine with exactness the development of the child. The little one is subjected to an especially nutritious diet of the most tonic kind if it had been previously fed from a goat liable to convey contagious germs, it having been found by experiment that the milk of this animal, although possessing nutritive principles of the most salutary kind, presents the inconvenience of communicating by absorption the effects of those nervous accidents to which the goat is subject. The public charities of Paris have substituted for the milk of goats that of the ass, and have installed an ample yard near the pavilion of the sickly and scrofulous children, which is only separated by a short, covered passage-way. The nurses, each carrying a child on the right arm and a little stool in the left hand, present themselves in turn to the women who have charge of the animals, and they hold the child, applying its lips to the teats of the docile animal. The children suck with avidity the liquid nutriment, which is fresh and of agreeable taste. The Administration of Public Assistance of Paris has calculated that one young ass is able to lactate abundantly for a space of nine or ten months, and when this period has passed they are sold and replaced by others.

Sterilized Milk.—Robert Stewart,⁵⁸ gives the following results of four months' work (September 1, 1888, to January 1, 1889) at the Home of the Friendless and Foundlings, in Cincinnati, by the use of sterilized milk. During the period of time mentioned above fifteen foundlings were fed upon sterilized milk, which was prepared in the following way: Pure, unskimmed Jersey milk was put into quart (litre) fruit-jars, and brought to the boiling-point in a water-bath; the tops of the jars were then screwed on, the jars removed from the bath and put into a cool place. When feeding-time came this milk was diluted according to Schedule No. 1, opposite page, put into thoroughly-cleaned feeding-bottles, with plain-rubber tips, and given to the patients. All bottles, tips, jars, etc., were thoroughly cleaned after use, and then allowed to stand in a solution of bicarbonate of soda, $\frac{1}{2}$ ounce to the quart (15.5 grammes to litre), until next feeding-time, when they were again washed in hot water. Boiled water is used for diluting the milk. The absolute quantity of liquid given varies with the capacity of the infant.

SCHEDULE No. 1.

AGE.	Quantity.	Interval of Feeding.
Under two weeks	$\frac{1}{2}$ milk, $\frac{1}{2}$ water.	1 $\frac{1}{2}$ hours.
Between two weeks and one month	" "	2 "
Between one month and three months	" "	3 "
Between three months and six months	" "	3 "
Between six months and nine months	" "	4 "
Over nine months	All milk.	4 "

This schedule is of only general application, as it must frequently be varied to suit the individual needs of the little patients; but the following schedule (No. 2) shows the effect of this method of feeding by that test which alone is of real value in the nutrition of infants, namely, the weight. This table shows the ages and the weights at periods of about two weeks each:—

SCHEDULE No. 2.

No. of Child.	Age.	Oct. 1. Lb. Oz.	Oct. 20. Lb. Oz.	Nov. 3. Lb. Oz.	Nov. 17. Lb. Oz.	Dec. 1. Lb. Oz.	Dec. 21. Lb. Oz.
1	8 months.	9 4	9 13	10 4	10 9	11 8	11 4
1 A	Transient.	Adopted.					
2	10 months.	17	Adopted.				
3	18 "	12 10	Adopted.				
4	2 "	5 7	6	6 8	Died (a)		
5	4 "		7 12	7	7 8	7 8	7 6
6	3 "		5 10	6 7	6 8	6 12	7
7	2 weeks.		5 14	6 10	Adopted.		
8	12 months.			17 10	17 10	17 11(b)	17 10
9	8 "			6 12	7 4	Adopted.	
10	2 weeks.				6 8	6 8	7 8
11	24 hours.				6 4	4 2(c)	
12	1 week.					6 2	6
13							Not taken (d)
14							

(a) Congenital syphilis. (b) Given bread and milk. (c) Child developed catarrhal pneumonia, and was put upon other diet and medicinal treatment. (d) These were transient inmates, whose weights were not yet taken, they having come into the institution but a day or two before December 31st.

These figures will show a constant gain in weight, with but one death. Even in the case which died the food seemed to be doing its work well, as there had been a decided increase of weight until the final illness. During the four months ending January 1, 1889, there had been but little trouble in the way of stomach and intestinal disturbances. The writer has found sterilized milk of great value in private practice.

E. F. Brush,⁶¹ asserts that cows' milk is the best food for the artificial feeding of infants, and when it fails the fault lies in one or the other of the following conditions, or several of them combined : 1. A faulty condition of the cow herself, which will be indicated by the condition of the albuminoids. 2. Improper food or an improper manner of feeding and caring for the animal, which will be indicated by the fats and salts. 3. Improper handling of the milk after it is taken from the cow, which will be indicated by the ptomaines and extractives. A proper understanding of these three sources of danger will make the feeding of infants a simpler matter than that offered by any of the substitutes, and be, at the same time, a more rational method. The conditions of the animal that render her milk unfit for food must be considered. The cow is a unique beast, differing, in many respects, from any of our other domestic animals. One of her peculiarities is her normal temperature. The author searched diligently in books devoted to bovine pathology to find the normal bodily heat of the cow, and the confusion was puzzling. It is variously stated at from 98° to 101° F. (36.7° to 38.3° C.). The writer has made several hundred thermometrical examinations under varying conditions, and found that the temperature was not constant in apparent health as in the human subject. Of course, it is difficult to tell to a certainty how near to health a dumb creature is. The standard usually adopted with these animals is that they are in health when they perform their functions with profit to their owners. Certainly, there are many slight ailments that do not carry the animal beyond this limit; therefore, the varying temperature in the cow may be due to slight ailments that do not demand the attention of the veterinarian. Brush found the average temperature of the cow in apparent health to be 102½° F. (39.2° C.), ranging from 101½° F. (38.5° C.) to 103° F. (39.5 C.). This, of course, is a peculiarity of the cow, and none of the other large domesticated animals maintain so high a bodily temperature. Another peculiarity of the cow is the constant employment of her generative functions. She is always milking or pregnant, and both the uterus and the mammary glands are employed almost constantly at the same time; hence her nervous functions are exaggerated. Therefore, with an abnormally high temperature (the author having found that bulls and steers have not so high temperature as the milking cow), and

with an unnatural functional activity of the organs of generation, she is used also as a machine to transform food into milk, and it is astonishing to what capacity she has been trained in this direction. With four stomachs, the first alone with a capacity of 60 gallons, she simply eats, and will eat anything. In health she is always either eating or chewing her cud, and her pedigree sometimes shows the closest consanguinity in her breeding. Now, when all these unusual conditions are considered, is it at all to be wondered at that the ordinary dairy-cow is, as a rule, an unhealthy animal, more prone to bacillary phthisis and scrofulous affections than other animals? Her nervous system is more subject to severe shocks, and, in fact, she is a delicate creature. Her attendants are not usually either mild or cleanly, nor is her housing always the best.

The next consideration is the feeding and care of this nervous and delicate animal. The ordinary dairyman receives for his milk $1\frac{1}{2}$ to $2\frac{1}{2}$ cents per quart. At this low price received by the producers he cannot usually give his cattle the best food. An estimate from the New York Dairy Commissioners was published the past summer in a dairy journal. Taking the milk received at the creameries as a basis, the average income from each cow was found to be about \$25 a year to the producer, which is scarcely 7 cents a day, from which the dairyman has to buy food and pay for labor. It is evident that this sum alone would not begin to pay for proper food for the animal; hence, the farmer is driven to every known expedient to keep his cows in milk, and the profit being so small, if there is any profit at all, he must utilize every drop of milk, whether the animal giving it be sick or well. In this state of affairs, is it not natural that all the cheap goods, such as brewery grains, distillery slops, the refuse from starch factories, enter so largely into the food from which the daily supply of milk is produced? Good food is to the cow the prime absolute essential for the production of good milk, and unless people are willing to pay more for their milk than they do at present a reform in this direction cannot be expected.

The handling of the milk after it leaves the cow is the next important consideration. Owing to the cow's natural high temperature (102° to 103° F.— 38.1° to 39.5° C.), the milk, when drawn, must cool rapidly, and, this first cooling taking place in the

cow-house, the milk is, of course, more or less affected by the conditions generating odors. If these odors are not very bad, they can be removed, more or less perfectly, from the milk by a process of aëration. This can be accomplished either by pouring the milk from one vessel to another in a thin stream, in the presence of a pure atmosphere, or, on a large scale, by pumping pure air into it by a suitable machine. One of the most dangerous methods for killing the odors that milk absorbs from dirty stables or improper food is that recommended by many practical and otherwise sensible men, namely, the addition of nitrate of potash. It is very easy, from this addition of nitre, combined with the glycerides and sulphates already contained in milk that is decomposing, to figure out, chemically, bodies approximating to nitro-glycerin. It is suggestively strange that the toxic effects of nitro-glycerin are similar to those of tyrotoxin. The often-reported detonation of this latter extractive, while undergoing examination in the laboratory, is also suggestive of the properties of nitro-glycerin. The addition of chloride of lime, which is also recommended for the same purpose, although apparently a less dangerous chemical compound, should, nevertheless, be prohibited.

Milk that is procurable too far away to reach the child within a few hours should not be used for infant feeding. The different degrees of temperature through which it must pass in its transit by country wagon, railroad train, and city express, are productive of changes that cannot but deteriorate the quality of the milk. It is well known that light, as well as heat, is one of the elements that hastens decomposition in milk; hence, the now popular method of serving milk in clear-glass bottles is also an error.

No milk should be served by the milkman for infant feeding after it is twelve hours old, nor should it be served to the infant while it is warm, immediately after leaving the cow, as the author has found by actual experiment that cows' milk, while still retaining the animal heat, if taken into the stomach, would coagulate into a solid mass; but this coagulum is not so hard and rubber-like as the curd formed when the milk is too old.

Wood,¹⁹¹_{July 13} of Pittsburgh, employs the following method in preparing cows' milk for infants: The milk should be from a clean dairy and from healthy cows; it should be placed in glass jars of the size required for use, which can be tightly closed with a lid after

being entirely filled with the milk. When kept from contact with air in this way, the milk will not turn sour for several days. When the jar of milk is opened, one-half is to be treated with rennet and the curd separated; the whey is then added to the other half of the milk, and a little cane-sugar added. This prepared milk is then kept in a closed glass vessel, and portions taken from it for feeding the infant as required; the milk food can be warmed, but not made hot. The writer claims that fresh milk is aseptic, and that it can be kept so by excluding air; he considers the dilution of the milk necessary, but prefers to use whey, for this purpose, to water, which may be contaminated. He prefers cane-sugar to milk-sugar.

Arthur V. Meigs,⁵⁹_{Oct. 12} in a paper read before the American Pediatric Society, said that, after a long experience, he had seen no reason for making any radical change in the artificial food which he had previously recommended. He had found that mothers' milk never contained more than 1 per cent. of casein. This food is based upon the dilution of cows' milk, for the reason that it contains too much casein; the further need of the addition of cream, because, in diluting, the fat is reduced to too small an amount; the addition of sugar, to make it equal to the amount contained in human milk, and of lime-water, to change it from an acid to an alkaline fluid. However, he had fallen upon several improvements to render it easier to get together the required amounts of the different constituents, and thus simplifying the work of the nurses. He directs that, instead of taking cream and milk in the proportion, respectively, of 2 and 1 in 8, three parts of weak cream be used, which is obtained as follows: One quart (litre) of sound milk is placed in a high vessel and allowed to stand in a cool place for three hours. Then 1 pint (0.5 litre) is poured slowly from this, care being taken that the vessel is not agitated, the object being to obtain the upper layer of fluid, rich in fat, and leave the lower, comparatively poor, portion behind. When the child is to be fed, there is taken of this weak cream 3 tablespoonfuls, of lime-water 2 tablespoonfuls, and of sugar-water 3 tablespoonfuls. The sugar-water is to be made in the proportion of 18 drachms (39 grammes) of milk-sugar to 1 pint (0.5 litre) of water. This is an improvement upon the food recommended previously by the author, because it is more economical (cream being expensive) and the food is less likely to ferment.

Burggraeve²²⁹ employs a weak infusion of coffee to nursing infants to relieve thirst in preference to water. The infusion is made in the following way: Take an ordinary glass funnel, and pack the neck closely with cotton wadding; then place it in a glass. Put 1 tablespoonful of ground coffee into the funnel, and pour on 1 glassful of perfectly clear water. The solution of coffee thus formed, filtering slowly through the wadding, leaves behind its oily or empyreumatic products, and the result is a clear, aromatic liquid, which should be sweetened with a little white sugar, and a teaspoonful should be given as required. This tonic drink quenches the thirst and refreshes the child.

Red Milk.—Robert Main² reports the following case of so-called *red milk*. Mrs. W., a multipara, aged 30, was recently confined, and two days later drew the author's attention to the pink color of her night-dress in the immediate neighborhood of the mammary glands. She said the milk appeared perfectly natural on excretion, but after drying on her night-dress it became a light-pink or magenta color, and this color did not only appear on the night-dress, but on any other white substance that was applied. The writer is satisfied that no deception was practiced, as he carefully watched the proceedings himself. The patient was on an ordinary milk and farinaceous diet, no drugs having been administered.

GROWTH AND AGE.

By CHARLES SEDGWICK MINOT, M.D.,

BOSTON.

THE usual supply of centenarian paragraphs brings little of value. A recently published list,⁸² which may interest the curious, purports to enumerate 54 persons who have exceeded the age of 125 years. It will be remembered that 107 years is the limit beyond which there is no authenticated case.

The registrar-general of Ireland, Grimshaw, in his twenty-fifth annual report, states that the deaths registered during the year 1888 included no fewer than 208 persons stated to have aged upward of 100 years at the time of their decease; this number included 87 males and 121 females. He adds the astonishing statement that, "further inquiry having been made, it was ascertained that the ages of the centenarians, as given in the records, were in every case confirmed."

A London editorial writer⁶ very justly points out that, since in England and Wales, where the records are much more reliable, there were only 2 deaths of centenarians in 1887 per million of population, it is highly improbable that there should be 45 per million in Ireland, which is the proportion given by Grimshaw.

To our knowledge of the changes of old age little has been added. Humphrey⁶⁴⁶ has studied senile changes in the bones. As the internal erosion exceeds the external apposition, the bones lose first by resorption of the cancellous parts, and later by erosion of the solid structure, in consequence of which the bones are weakened; but, owing to the loss of muscular power, the danger of spontaneous fracture of the bones is not much increased. The predisposition to the absorption of the cancellated bone causes the increased tendency of the long bones to break at the head or neck of the shaft. An exception to the cancellous resorption is not infrequently found in the bones of the cranium; indeed, the weight of the calvarium may even increase, in marked contrast to the facial

bones, which always thin out. Massé⁶_{Am. 30} has investigated the urinary excretion of aged persons, with a view of determining the "denutrition" of advancing years. Dividing organic and mineral substances eliminated in the urine into two groups—the completely oxidized and the incompletely oxidized—he finds that the former are notably diminished and the latter notably increased in old age. The proportion between the different completely oxidized elements remains much as in the adult. There is a marked increase of imperfectly oxidized phosphorus, which, as Lépine thought, seems to depend much more upon the diminution of organic combustion than on a more active nervous disintegration. The conclusion is that the failing nutrition of age is not shown specially in any system or tissue, but that it is general and gradual, affecting all parts of the organism.

Mettenheimer³⁸⁸_{Med.} describes 2 cases of periodic fluctuations of nervous and psychic activity in patients of 90 and 92 years. Both of these were lethargic during the morning; one became cheerful and intelligent toward evening, the other in the afternoon; the alternation recurred daily during a considerable period.

T. Korösi⁸⁴_{Ang.} has attempted to demonstrate a relation between the vitality of children and the age of the parent. He maintains that vital weakness and tuberculosis are more frequent in children of fathers under 25 years and mothers under 20 than in those of older parents; also, that a larger proportion die within the first month, when the parents are under 25, than when they are between 25 and 40. He considers the most favorable combination to be a mother 20 to 30, and father 25 to 35 years. It may be questioned whether these figures have much real significance, for it may well be that there are class differences, and that in the poorer classes the mothers have children earlier, and that the difference is due to social conditions, and not to the age of the parents.

T. W. Grimshaw¹⁶_{Jed.} has studied the child mortality in Dublin. The annual death-rate per 1000, among infants under 12 months, is: In England, 167.8; in Scotland, 135.3; and in Ireland, 115.5. For children under 5 years of age, the rates are: England, 58.4; Scotland, 57.4; Ireland, 36.6. We thus arrive at the broad result that the death-rate of infants and young children is much lower in Ireland than it is in England or Scotland. This difference is attributable to the excess of town population in the latter countries,

56.3 per cent. of the English against 16.3 per cent. of the Irish living in towns of over 10,000 inhabitants. Now, in Dublin 210.1 per 1000 of the children under 1 year die annually; hence, although Dublin is situated in a country of which the death-rate is low, its child mortality is high, and high as compared with other towns. Thus, for 1000 registered births there are infant deaths in London, 152; Liverpool, 180; Bristol, 141; Edinburgh, 130; Glasgow, 144; Cork, 121; and Dublin, 184. The excessive infant mortality is attributable (1) to the large proportion of the very poor; (2) the inferior dwellings of the laboring classes; (3) the habits of the people, especially that of drinking; (4) improper care, especially of the sick children. Of all influences the most noteworthy is the drink-rate, for it appears that with the remarkable exception of Edinburgh, which has a high drink-rate and low child mortality, the greater the number of "drunks" at the police-courts the greater (speaking generally) is the child mortality. The remarkable high death-rate of children in Dublin has also been pointed out by Sir C. A. Cameron¹⁶_{Sept.} in a brief article.

A valuable paper on the "Growth of Children," by Monti, of Vienna,¹⁵⁸_{8,10,11,12} has appeared. He presents a *résumé* of what is known of the subject, bringing forward especially such points as are of value to the clinician and practitioner. The article is very well done, except that he fails to cite the authorities for his figures, and in his statistical tables fails to give the number of observations on which the averages are based. In spite of these obvious deficiencies it is the best summary we have of our knowledge of the growth of children; as, however, it contains almost nothing original, it is unnecessary to give an abstract here of its contents.

From an analysis of a large number of observations, made in the Pathological Institute of Munich, K. Oppenheimer⁶¹_{Nov. 2} makes the following deductions: 1. The bodily weight reaches its highest relative standing earlier in females than in males. The weight of the adult man is about twenty times as great as at birth; that of the adult woman eighteen times as great. The length of the body reaches its highest relative point in man at the age of 15 years, when it amounts to 158 centimetres (5 feet 2 inches); in woman the highest relative point is reached at the same age, and amounts to 153.6 centimetres (5 feet). 2. The growth of the lungs surpasses that of the body, as a whole, at nearly all periods, and

especially at the middle period of growth. 3. The heart increases approximately in proportion to the entire body. 4. The spleen and kidneys increase proportionately with the heart. 5. The liver and, notably, the brain do not develop proportionately with the body. 6. The relative lack of development in the liver and brain is compensated by the rapid relative increase of fat and muscle, particularly the latter.

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By C. SUMNER WITHERSTINE, M.S., M.D.,

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The Nourishment of the Sick.

TWO problems are presented in every case of sickness:

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Editorial Note from

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THE JOURNAL OF THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL.

April, 1890.

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ONE of the signs of progress both in Dietetics and Therapeutics is the growing demand for pure, natural products of the grape. Foreign wines are so frequently fortified and flavored, or else shamelessly imitated by skillful compounders in the laboratory, that it has become very difficult to obtain a sound, unadulterated wine bearing a foreign label, notwithstanding the fact that a high price must be paid for imported goods. Impelled by these considerations, brains and capital have been engaged in developing our own resources, and few persons are aware, unless they have had their attention directly called to the matter, what great advances have been made by the wine-growers of the United States, especially of California. It is to the choicest products of the latter highly-favored region that we wish to invite attention.

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HEALTH RESORTS AND SANATORIA.

ALTHOUGH man, unlike other animals, has no special *habitat*, and can live in every clime and in almost all latitudes, he has learned by experience that some localities upon the earth's surface are especially unhealthy and are to be avoided, while others are eminently restorative and salubrious, and are therefore sought after as desirable places of residence. From the earliest dawn of medical art, the health-giving and invigorating qualities of certain places were utilized for the benefit of the sick. In fact, the ancients showed their appreciation of the powerful remedial agency of climate and hygienic surroundings by building temples to Æsculapius in localities of repute for their health-restoring powers; so that the cures obtained by natural means would be ascribed by the vulgar to supernatural causes. This is referred to by Dunglison ("History of Medicine," p. 44) in the following words, viz.: "Most of the temples, too, were situated in very salubrious places, and had either in their interior or in the environs mineral and thermal springs. It is therefore easy to conceive that the purity of the atmosphere, and the change which the sick experienced in their pilgrimage to consult the oracle, had a powerful influence on their cure."

Similar marks of appreciation of the value of sanatoria in restorative medicine are found in all systematic works on therapeutics from the oldest to those the most modern. At the present day, however, owing to the wide dissemination of information regarding health resorts and more exact knowledge concerning the effects of certain climates and elevations upon particular morbid condition, physicians are able to advise their patients with greater positiveness as to the special resort which presents the conditions best suited to their morbid state. This is not the place to engage in the discussion of climatology or therapeutics, or to state the relative advantages of high or low altitudes, of marine or inland climate, or of warm or cold latitudes, for special diseases. These, important as they are, belong to the systematic treatises upon climatology, demography, and hygiene. The object in view in these pages is to direct our readers to the notices of a few select health resorts, which are well and favorably known to the medical profession, and possess a well-established reputation among all classes of the community, as Sanatoria. From the data here presented, physicians and patients can determine positively upon the most appropriate health resort in each individual instance. In the past it has been thought sufficient to send the patient away from home, and, if he has an incurable disease, as far away as possible; but ignorance upon this subject in the physician is no longer tolerated, and if he allows a patient to go to the sea-shore when he should have sent him among the pines, or direct him to the Antipodes when some resort nearer his home would have done him an equal amount of good, he cannot escape censure.

A RESORT FOR CONSUMPTIVES.

IT may not be generally known that this country possesses within its boundaries what is undoubtedly the most healthful spot in the world for people threatened or afflicted with lung disorders, i.e., Tarpon Springs, Hillsborough County, Florida. No other region seems so perfectly adapted to this purpose. The sudden changes in temperature which occur, to a greater or lesser extent, in every other region, are here unknown; an almost uniform temperature reigns throughout the year. Storms are infrequent and never cold or severe; the cold winds of the north and northeast are tempered to mildness through their long journey across the State of Florida and over the warm waters of Tampa Bay.

While Southern California has the Sierras, Colorado the Rockies, the Riviera the Alps, and Florence and Naples the Appenines, the Point Pinellas Peninsula, on which Tarpon Springs is situated, has no lofty contiguous mountains to send down sudden chilly winds from summits capped with eternal ice and snow, and spring and summer reign supreme. The mid-year seasons, tempered by the surrounding waters, are never excessive as to heat, cool and breezy nights rendering blankets obligatory. This is a country where the orange, lemon, peach, fig and guava, the pine-apple and banana, and other choice and delicious fruits grow in abundance, while early vegetables may easily be raised to find a ready market for those who may wish to avail themselves of its agricultural advantages. It is a land of sunshine and flowers, of boating, hunting, and fishing, of sparkling waters and breezy woodlands, of lovely views. In other words, it is a region where pleasure and robust health go hand in hand with ambition, development, and prosperity.

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(Patented May 6, 1890.)

To Physician, Nurse, and Patient:

The inventor of this little machine has but one request to ask. It is this: READ THE STATEMENT MADE BY THOSE who have witnessed its working.

J. G. THROWER'S

INVALID LIFT,

Atlanta, Ga.

Pat. May 6,

1890.



From chair to bed, or to any position required.

Floor space occupied, 2 ft. x 2 ft. 8 in.

[From the New York World, Nov. 17, 1890.]

"At the Piedmont exposition Mr. James G. Thrower, of Atlanta, had on exhibition what is probably the most remarkable piece of mechanism ever conceived for the painless and easy handling of invalids. It is an invalid lift, by which a person afflicted with paralysis or other disability can be moved in any position, from upright to horizontal, with no pain to the sick and little effort on the part of manipulator. In fact, it can be operated by a child. It lifts the invalid from the bed, holding him in an easy position at any angle, and moves him from the bed to a chair or about the room. It takes the patient from a chair and straightens the limbs ready for bed, bath, or any position desired. It is very simple in construction, but performs its work with almost human intelligence. Mr. Thrower intends to put it into the hands of some leading concern making a specialty of appliances for invalids. In my estimation this comes in the line of important sick-room adjuncts, and should receive the immediate attention of a metropolitan agency for such things."

ATLANTA, GA., Jan. 13, 1890.

I have witnessed the practical operation, in the case of a confirmed invalid patient, of Mr. Thrower's Invalid Lift and Support, and regard it as a wonderful invention and a thorough success.

F. H. ORME, M.D.

ATLANTA, GA., Jan. 12, 1890.

I have examined—also used—Invalids' Lifts and Supports on this and the European continent, but have never seen one that could practically bear comparison with the one invented by J. G. Thrower, of this city.

C. A. STILES, M.D.

ATLANTA, GA., Dec. 25, 1889.

Mr. James G. Thrower:

DEAR SIR—I have been using your Invalid Lift and Support for two months, and I find it all you claim for it. It is easily adjusted, very simple, and the largest man can be raised without feeling any pain. In fact, I think it one of the best inventions of the age. Yours truly,

R. I. HOPE, M.D.

Dr. Hope is the physician in charge of the Fulton County Almshouse, Atlanta, Ga.

MERCHANTS' BANK OF ATLANTA,

ATLANTA, GA., April 14, 1890.

Mr. J. G. Thrower:

DEAR SIR—As you are well aware, seven weeks ago yesterday (Sunday), while my mother (aged 77 years) was on her way to church, she stepped on a banana-peeling, which caused her to fall on the hard brick pavement, breaking her left leg below the hip and badly bruising the limb and body. After the limb was set troubles incident to old age began. For two weeks her position could not be changed so the bed could be "made up." We lifted her on a sheet, giving intense pain, twice to change the sheets. This required four strong persons besides her attendants. At the expiration of the two weeks we got your lift, and have used it almost daily with perfect success, enabling her to rest awhile out of the bed and giving us a chance to "make up" her bed. When we got your lift the lower part of her body (about the hips) was so sore that this part of her was as raw as a piece of fresh beef. The lift enabled the nurse to get at this sore, and I am happy to say that, under the skillful treatment of her surgeons and the great blessing of your wonderful lift, the sore was quickly cured. Of course, I may be extravagant in what I say, but I firmly believe that if we had not your lift all the medical skill of all the surgeons in the city could not have saved her life. Independently of the blessing to the sufferer, I regard it very economical, as a child can handle a patient. Yours sincerely,

R. M. FARRAR, CASHIER.

We invite correspondence as to furnishing Lift, prices, etc.

Respectfully,

JAMES G. THROWER, Patentee, Atlanta, Ga.

Office—9½ EAST ALABAMA ST.

P. O. Box 108.

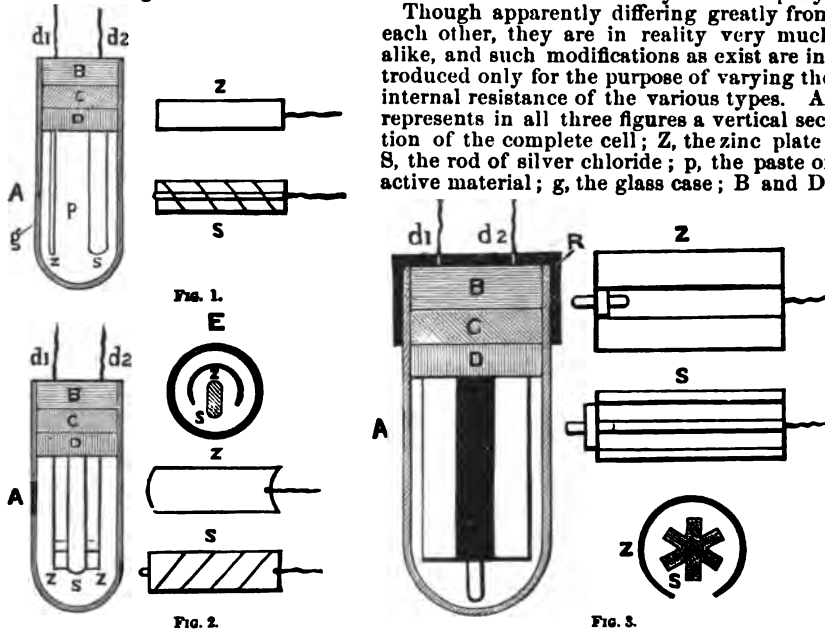
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The Chloride-of-Silver Cell, as manufactured by the JOHN A. BARRETT BATTERY CO., consists essentially of the following parts: A rod of pressed chloride of silver, a rod or plate of zinc, and a paste containing some sulphate of zinc. The cell case is a glass vessel having a rounded base, and provided with a sealing or stopper, through which the electrode wires pass, and which serves to seal the cell hermetically. The sealing consists of several parts, and is very strong and resisting.

In the figures 1, 2, and 3 are shown the cells as made by this Company.

Though apparently differing greatly from each other, they are in reality very much alike, and such modifications as exist are introduced only for the purpose of varying the internal resistance of the various types. A, represents in all three figures a vertical section of the complete cell; Z, the zinc plate; S, the rod of silver chloride; p, the paste or active material; g, the glass case; B and D,



the hard portions of the sealing; C, the viscous, semi-fluid portion; while d₁ and d₂ represent the electrodes, connected respectively with the zinc and silver poles.

Fig. 1 shows the small, so-called galvanic cell. Here, both the zinc and silver are in the form of flat plates. Fig. 2 is the medical cell. Here the zinc plate is bent into the form of a half cylinder, the object of doing which is to increase the active surface of the plates and to diminish their effective distance apart, thus reducing the internal resistance of the cells. Fig. 3 represents one of the newly-constructed "large-current" cells, in which the silver pole is in the form of a six- or eight-rayed star, and the zinc an almost complete cylinder. These cells are suitable for any kind of medical work, except, of course, for cauteries, and have been found very valuable in the treatment of diseases according to the method of Apostoli. They will readily yield a current of an intensity as great as 600 or 700 milliamperes. In every case the electrodes are carefully separated within the cell by means of some insulating material, such as hard rubber or gutta-percha, thus effectually preventing any possible short circuit. The advantages claimed for these cells are: *Constancy of action* and of *electromotive force*; *reliability*, *portability*, *cleanliness* (owing to absence of acids), *compactness*, and *small size*; *freedom* from requiring any *attention* whatever. They never get out of order. They have been adopted in the Wards and Dispensary of the Johns Hopkins Hospital, Baltimore, Md.

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